Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone Sound Wave

PUBLISHED WEEKLY BY TELEPHONY PUBLISHING CORP.
608 S. Dearborn St., CHICAGO

H. D. FARGO, President and Treasurer
S. R. EDWARDS, Editor and Secretary

H. D. FARGO, Jr., Vice-President and Advertising Manager
D. C. SORENSEN, Western Advertising Manager

Entered as second-class matter September 4, 1908, at the postoffice at Chicago, Ill., under act of March 3, 1879.

Volume 101
Number 20

CHICAGO, SATURDAY, NOVEMBER 14, 1931

Subscription — 10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

TELEPHONE SALESMANSHIP AND THE REVIVAL OF BUSINESS

Telephone companies are devoting more attention to salesmanship these days than ever before. This, of course, is due to the business depression, and arises from a desire to overcome the cancellations of service which most companies have experienced during the last two years.

All lines of business have found it necessary to seek new customers to make up for the reduced volume of sales, and telephone companies have participated in the same trouble, although not to such an extent as other industries.

* * * *

It is typical of the spirit of American business that whenever sales begin to drop off extra efforts must be made to stop the loss and turn the tide to running the other way. It is that spirit which has enabled the United States to utilize its natural resources and man-power, and to achieve the business success that is the envy of the world.

General depression which afflicts all the countries on the globe, however, has not spared our own land, and in consequence the intense urge for increased sales has placed a new emphasis on salesmanship in all its phases.

* * * *

So far as telephone companies are concerned, these sales campaigns have had gratifying results, as most of them report considerable new business.

For many years after the telephone proved itself as an indispensable factor in both business and social life it was seldom necessary to make a systematic effort to obtain all the subscribers that could be comfortably handled. In fact, the chief concern of most companies was how to obtain the capital needed to supply the demands for service that came knocking at the door. In most cases the business flowed in unsolicited.

The change in the situation caused by the depression has compelled companies to invent sales plans and teach their employes how to secure new subscribers and to retain the old ones who contemplated the doubtful economy of getting along without telephone service. It has been a serious task, but reports from the field indicate that it is making encouraging progress.

* * * *

Many Independent companies are reporting material gains in stations by reason of their aggressive efforts to obtain new business, and in most communities these additions have more than made up the losses the local companies suffered during the slump.

The Bell System reports that September showed a gain of 12,500 stations among its associated companies, which was the first month of this year that did not show a loss. During the previous eight months the Bell had lost 220,000 stations, which, however, was only 1⅓ per cent of the total number of stations in service at the beginning of the year.

It goes without saying that nearly every business in the country would consider itself very fortunate to be able to report a loss in volume or production as low as that since January.

In fact, if the steel, railroad, automobile and other major industries had experienced a loss of only 1⅓ per cent, the country would rightly consider the business depression as being actually over.

On the other hand, the 103 telephone companies reporting to the Interstate Commerce Commission for August show a loss in stations for that month of only 1.2 per cent. The 103 reporting included both Bell and Independent companies.

* * * *

In its efforts to hasten the return of a trade boom, general business is encountering evidence indicating that possibly there may be too much enthusiasm in blindly driving for more and more sales even in dull times. This might be called a "super-salesmanship," which implies a hounding of customers for orders that they might be better off for not giving.

A writer in a national weekly recently touched on this subject and gave good arguments to show that "super-salesmanship" might very well prolong a depression. The idea that sales must be forced up a certain per cent every succeeding year, regardless of conditions, dislocates healthy development and defeats the purpose of solid prosperity for the firm and retaining the good will of its customers.

The idea that a business could not stand still and be healthy, and that unless it showed a good gain every year it was

going back, may have been logical when increasing population demanded more goods than were being produced. However, many level-headed business men now suspect that the present depression is partly due to the fact that our mass production and high-pressure sales methods loaded too many people up with more things than they could economically digest in the given time.

Another angle showing the perils of "super-salesmanship" in general business referred to in this article touched on the wrecking of efficient sales organizations by the unwise zeal to increase orders on the part of executives whose sole thought was "more business this year than last."

Compelling salesmen to meet their "quota" on pain of losing their jobs, it was pointed out, inspired a feeling of discouragement and fear that soon percolated to their many friends, and actually led to a curtailment of buying, rather than an increase.

If the salesman lost his position his relatives would have to assist him financially, and that in turn would compel them to economize and save the money that might have been spent in general buying.

In short, the idea was advanced that too strenuous a selling drive might react and discourage public buying, thereby counteracting or postponing a healthy return to normal business.

* * * *

Of course, this hardly applies to the sales effort of telephone companies that have a useful commodity to offer at a comparatively low price. Every family is a prospective customer for service, and no household or business office is apt to be oversupplied.

The only element of "super-salesmanship" danger for a telephone company to look out for is the enrollment of subscribers who will not be permanent users, or who will not meet their bills promptly. Getting a contract from a subscriber who would cancel the next month, of course, would be of no value; neither would be the obtaining of an account which could not be collected.

* * * *

In seeking new business during these times telephone workers are doing a good job convincing people that they can save time and money by a more liberal use of telephone service, and add to the satisfaction and convenience of life at a comparatively trifling cost. This will bring good results to both the public and the company in future years and justify such efforts.

COMING CONVENTIONS.

Illinois Telephone Association, Pere Marquette Hotel, Peoria, November 18 and 19.

Canadian Independent Telephone Association, Carls-Rite Hotel, Toronto, November 18 and 19.

Nebraska Telephone Association, Hotel Paxton, Omaha, February 9, 10 and 11, 1932.

The Road to Good Public Relations

The Requisites of Satisfactory Relations With the Public Include Technically Good Telephone Service, Pleasing Contacts, Acceptable Charges, a Knowledge of Public Attitude and the Dissemination of Information About Business

By W. B. T. Belt,
President, Northwestern Bell Telephone Co., Omaha, Neb.

Two American aviators circle the globe in nine days. In an hour we go as far by automobile as our forefathers could have gone in a day. We read about events in all corners of the earth the very day they occur. A turn of a switch and we follow our favorite football team on a gridiron a thousand miles away.

We are living in an age in which, more than in any other, man has brushed aside the barriers of time and distance with the result that we of today live, in terms of accomplishment, vastly longer than people have ever lived before.

To this conquest of minutes and miles, the telephone industry in America has contributed its full share. In no other land is the telephone so widely used, and in no other nation is telephone service better.

Without the splendid cooperation which exists among the thousands of companies within our industry, the present high quality of nation-wide telephone service would be impossible.

Public Cooperation Is Important.

But essential as is this cooperation within our industry, it alone cannot enable us to attain our objective. This objective, as I see it, is to furnish maximum service to our customers at minimum charges. In order to do this, it is essential also that we have the utmost cooperation between our industry and the public not only in using the service properly but as citizens, property owners and investors.

As citizens, the public elects men to office to represent it. As property owners, it permits us to trim trees where necessary to obtain good transmission, to set poles in suitable locations, and the like. As investors, the public has furnished a large portion of the money required to provide the telephone property now in use. In the future, it will be necessary to secure additional money from the public for plant and equipment to satisfy still greater service needs.

In general, I think we have the confidence of the public. But it is important that we retain the public approval we now have and gain confidence where it may now be lacking. This can be done by operating our business in a manner which, in every respect, is satisfactory to the public.

Technically good service, of course, is essential to good public relations. But this alone is not enough.

Whether the exchange is a large one with complex service problems, or a small one where the problems are less intricate, service always can and should be furnished in a pleasing and thoughtful manner.

Pleasing Contacts Are Necessary.

A pleasant greeting and a sincere effort to serve those who enter the business office to their complete satisfaction; efficient and smiling service at the switchboard; prompt and cheerful response to trouble calls; watchfulness by installers to do a neat and workmanlike job; accurate and neat billing; careful and courteous driving of company cars; considerate cooperation with property owners—such things as these exert a wholesome influence in earning good relations with the public.

Every complaint should be looked at from the customer's point of view. Perhaps the complaint seems unreasonable. But we should never lose sight of the fact that to the person who makes it the complaint *is* reasonable.

However, no matter how well a complaint is handled it would have been better not to have had it. The occurrence leading to the complaint often leaves an impression which is not removed by satisfactory treatment after the complaint is received. "An ounce of prevention is worth a pound of cure."

Routines are necessary. They promote efficiency and economical operations and ordinarily should be adhered to. On the other hand, employes should personalize routine, take a sympathetic interest in the customer's problem, and in every instance do what ought to be done in that particular case. Arbitrary treatment never makes friends.

A great public utility association not long ago undertook to discover what the public thought about its member companies, their policies and practices and the quality of the service they provide, as well as why the public thought as it did. More than 250,000 customers were questioned by trained interviewers. It was found that impressions formed by the public from personal contacts with employes were very potent in influencing the public's opinion of the institution.

It is highly desirable, it seems to me, to incorporate in the training of every employe, instruction that will equip him or her to promote good relations with the public through intelligent and pleasing contacts.

Improvement Should Be Constant Aim.

Telephone service today is good—better than it has ever been before—but continuing service improvement should be our constant thought.

There are still many homes and some places of business that do not have telephones. Many of our customers may have inadequate service or equipment that is not located properly to enable them to obtain the utmost convenience and value from its use. Broadening the service and making it more convenient is a part of service improvement.

Each employe has many opportunities in every-day contacts with the public to point out the value of adequate telephone service. Making the most of these opportunities, I believe, is part of the job of every telephone employe.

Additional telephone subscribers increase the value of the service to everyone by making available more persons who can be reached by telephone. Adequate telephone facilities not only assist in serving the individual customer better but also improve the service generally by making possible more prompt answers, by increasing the percentage of completions, and the like.

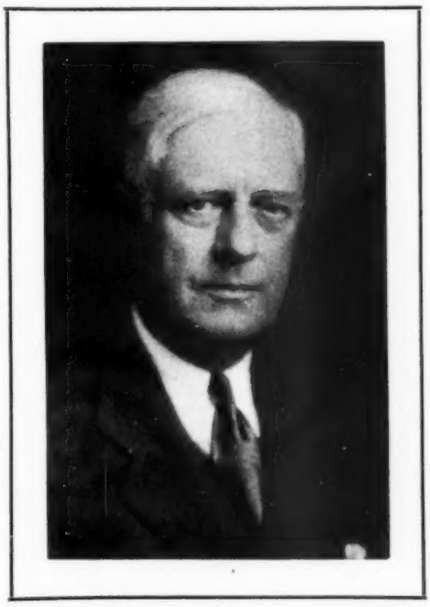
The history of the telephone is a story of constant progress toward the broadest and best possible telephone service. Our industry's effort to improve and expand service so as to make it increasingly valuable to the user has met with a high degree of public approbation, I am sure.

Our Charges Must Be Acceptable.

Necessary as they are, pleasing contacts and technically good and constantly improved service will not assure good public relations. In addition, our charges, policies and practices must have public approval.

Public acceptance of the reasonableness of our charges requires first, I think, appreciation of the value of the service. To a considerable extent, recognition of service value can be obtained by continually reminding the public, through newspaper advertisements and in other ways, of the telephone's usefulness not only in the everyday saving of time and effort that contributes so much to increased accomplishment but also its social value and indispensability in case of accidents, sudden illness and other emergencies.

Public approval of our charges also requires confidence that our properties are efficiently and economically operated. We must conduct our affairs in such a manner that the public will see that the business is thus managed.



"Constant Observation and Study of Public Attitude," Says Mr. Belt, "Is of Fundamental Importance . . . Having Determined the Attitude of the Public, We Are in a Position to Consider the Modification or Elimination of Things That Irritate."

Furthermore, our customers cannot be expected to accept the fairness of our charges unless they know that our earnings are and have been reasonable.

In this connection, I think there is need for informing the public regarding the effect of the present general depression upon our business. Contrary to a rather common opinion, revenues have fallen off considerably, but we have not been able to make corresponding reductions in expenses.

A fact which the public generally does not realize, I believe, is that we are not permitted to earn more than a reasonable return, even in times of general prosperity. When we point this out our customers will recognize the unfairness of urging that we make rate reductions in times of depression, the losses from which obviously could not be made good out of future earnings.

The cost of providing telephone service includes operation expenses, maintenance, depreciation, taxes and return on investment. We cannot eliminate any of these in good times or in bad.

Depreciation, taxes and return on investment are, to all practical purposes, fixed expenses. Depreciation keeps going on regardless of the extent of the use of the plant. Taxes are beyond our control. If we do not earn a reasonable return we cannot hope to get from investors, at a reasonable cost, the money which will be needed later on for expansion to meet the service requirements of the public.

Only operation and maintenance expenses are subject to immediate management control, and then only within certain limits. Since the general business recession began, it has been possible to reduce these expenses without violating principles of sound management but only enough to partially offset the amount by which anticipated revenues have been reduced owing to depressed business conditions.

The reduction of maintenance expenses to a point where the property would be so run down that it would not provide dependable service, or the reduction of operation expenses to the point where unsatisfactory service results, I am sure, would not meet with public approval.

In order to furnish continuously economical and satisfactory service it is necessary to anticipate future service requirements and to a considerable extent provide for them in advance.

When, as the result of an unforeseen general business depression, service requirements do not materialize as anticipated, we have idle plant on which we must pay carrying charges but which does not produce revenue. And, of course, when we also lose business as a result of the depression, we have a still greater amount of non-earning plant on which we must continue to pay carrying charges.

At a time of declining prices, a manufacturing business or a retail mercantile business can buy at lower prices and pass the benefit on to the customer. Their turnover is rapid. Telephone companies, on the other hand, do not sell goods. We sell a service. Our investment must be largely in plant, which is a long-term investment —the turnover is very slow.

The replacements of plant which we need to make each year are such a small percentage of our total investment that it would require a considerable decline in prices over a period of years to materially affect the investment per telephone and the consequent depreciation and other costs.

The price we pay for materials for keeping our property in repair has little effect on telephone expenses. It is so small a part of these expenses that even if there were a considerable decline in prices, it would have only a negligible effect on the cost of providing telephone service.

Despite our efforts to furnish service that is technically good, to see that all contacts with our customers are agreeable,

to constantly improve and expand our service, and to have our policies, practices and charges meeting with public approval, the final test of our performance is the public's opinion. Therefore, constant observation and study of public attitude is of fundamental importance.

We Should Know What Public Thinks.

There are a number of ways to measure public opinion. These include observation and inquiry by employes; interviews with leaders of thought in the community; analysis of service criticisms, and close contact with the activities of civic, farm and other organizations.

Careful study of information obtained through these and other sources will reveal not only the general opinion of the public about our companies but also the public's attitude toward rates charged for service, the manner in which business office and other contacts are handled, the quality of our transmission, and countless other things that have an important bearing on the relationship between our companies and the public.

Having determined the attitude of the public, we are in a position to consider the modification or elimination of things that irritate, whenever this is feasible. However, the condition frequently will be that a practice, method or particular charge is necessary in serving the public efficiently and economically but is irritating because it is not understood. It then becomes necessary to furnish additional information to the individual or group concerned.

Public Should Be Kept Informed.

We all agree, I am sure, that the public should be kept informed about our business. But sometimes we wonder how to present the facts.

One of the most effective ways of disseminating information, I think, is to have employes properly informed so that they can answer questions or volunteer information during their contacts with the public.

Inviting the public to visit our central offices also gives us a splendid opportunity to present interesting information about our business.

Advertisements in newspapers are an excellent means of telling our story to the public. This method is not expensive when the large number of persons who can be reached is considered.

Printed statements enclosed with bills for service or otherwise supplied to patrons, talks to groups of farmers and town business men and interviews with customers also are effective ways to present information to the public.

In the final analysis, I believe, first, that to attain our objective of maximum service at minimum charges we must have good public relations; and, second, that we can maintain good relations with the public only by conducting our business along lines which meet with their approval.

What Operators Want to Know

Local Completion Has Taken an Important Place in Telephone Work—A Completed Call Means a Satisfied Customer; Uncompleted Call Results in Unsatisfactory Public Relations

By Mrs. Mayme Workman,
Traffic Supervisor, Illinois Telephone Association, Springfield, Ill.

For many years we have been working to improve our toll completion and the results obtained have been very gratifying. We know that a completed toll call means satisfactory service to our customers and revenue for our company.

In the last few years local completion has also taken an important place in telephone work. We have the same objectives in view, satisfactory service to the customer and revenue for the company.

In completing a local call we have no ticket showing the amount of revenue received, but we do know that a dissatisfied customer may mean a lost customer, and lost customers result in loss of revenue.

An uncompleted local call means unsatisfactory service from the customer's standpoint, regardless of the reason for the incompletion of the call. And, as we are always striving to render satisfactory service, it behooves us to make an earnest effort to complete as many of our local calls as possible.

The following are some of the unsatisfactory conditions created by ineffective calls from the standpoint of the telephone company:

(a) Unsatisfactory relations with customers.
(b) More difficult operating conditions.
(c) Increased operating expense.
(d) Increased equipment expense.

These matters indicate the importance, both from the standpoint of the customer and the telephone company, of completing as many calls as possible on the first attempt.

The improvement in the number of calls completed depends upon the activities of all of the departments of the company. The following are some of the major factors affecting this work, from a traffic standpoint, and these are the things in which every traffic employe should be particularly interested.

(a) Subscribers whose facilities or habits cause incompletion.
  (1) Discovery of excessively busy lines.
  (2) Discovery and grouping of nonconsecutive trunks.
  (3) Discovery of subscribers' lines on which called party frequently fails to answer and those lines where the calling party does not wait long enough for the called party to answer.
(b) Classes of service on which special completion studies are most necessary.
(c) Calls abandoned because of operating errors or irregularities.
(d) Intervals at which don't answer reports are given.

Now that we realize the importance of local completion, let us all become completion-minded so that we will not have any abandoned calls due to lack of interest or effort on the part of the traffic department.

Questions from Illinois Operators.

1. In connection with local completion, what may be done to improve the DA-DW item?
2. What can be done when your board is heavily loaded with pay stations so that during the busy hours the operator fails to collect 5 cents on some calls?
3. Do you still write "T" under the word "OUT" when you pass a ticket to another operator?
4. Is the toll center operator supposed to leave the line when taking a toll call from any small office?
5. What are the specific differences in the reports, "UD" and "u indef"?

For answers to these questions from real Illinois operators, turn to page 36.

Telephone Dictation to Centralized Stenographer Helps Offices.

A new use of the telephone has been found to expedite business routine. Telephone dictation is now being practiced by several large companies, and they are finding that it saves time, prevents interruptions and centralizes the stenographic staff under supervision at all times.

Instead of calling stenographers into their offices to take shorthand dictation of acknowledgments, short letters and brief reports or memoranda, people are telephoning such items to typists in a centralized bureau. In some cases these girls type as the dictator talks; in others stenographic notes are made.

Students of office management will probably find this practice interesting because it opens a new field for further efficiency pioneering. It suggests the telephone's possibilities for even more versatile service.

As the telephone dictation practice is now working in certain Bell telephone companies, a stenographic bureau is established with some of the typists equipped with telephone operator's sets. The individual who is ready to dictate, calls his company's regular telephone switchboard operator and asks for "telephone dictation." He is then connected by telephone to one of the typists who is free.

Under Water Cable-Cutting Job of Diver

Diver Cuts Submarine Cables 100 Feet Under San Francisco Bay, Calif., So They May Be Pulled to Surface and Added Sections Spliced—They Are to Be Moved 1,000 Feet North to Clear Way for Construction of $75,000,000 Bridge

Alone, 100 feet under San Francisco bay, Calif., in inky black darkness, almost daily for the past three months, a diver has been enacting one of the strangest dramas found in American industry. His knee on an iron saw horse, a hack saw in his hand, and surrounded by a batch of tools of all kinds —a "young" hardware store—he saws away at a 1200-wire telephone cable.

Through the muddy water, he cannot see his hand before his face. With diving suit, his weight is 370 pounds, yet for an

Operator at Desk on Top Floor of Telephone Building in San Francisco. Above His Head is the Signal Light Used for Communication with Men on Barge Moving Cables in the Bay.

hour and a half he saws and hammers, pulls and cuts and digs, fastens ropes, and washes away mud with a stream of water from a nozzle and hose under 100 pounds' pressure. All the while he carries on an almost constant conversation by telephone. with his chief of the Pacific Telephone & Telegraph Co. on the company's barge 100 feet above. Other men protect his air supply and manipulate ropes running down to him, and shift steel lines and electrical cords and cables at his direction.

All this is being done so that the way may be cleared for the $75,000,000 San Francisco East Bay bridge. The bridge needs the exact route which telephone cables have occupied for nearly half a century. And from the first tiny cable laid in 1884, with 14 wires serving about 300,000 Bay people, has grown the present 12 mighty cables of over 5,000 wires carrying 270,000 words a minute at peak load, serving more than 1½ million people in the metropolitan bay area.

Most of the 12 cables have been cut in this way preparatory to splicing an added section to them in order to move them 1,000 feet north. Great precautions were taken in planning and executing the job of moving the cables, so that telephone service would not be interrupted. Emergency lines were hooked up to replace those in each cable as it was moved. Few telephones were affected by breaks in the lines according to Division Manager John D. Holmes.

To this strange drama of Diver William Reed's, there was added the other day another out-of-the-ordinary event. When one of the cables which Reed had cut through was raised to the barge, a telephone was hooked to its cut wires.

A transcontinental telephone call from New York was then put through to the barge to Assistant Vice-President J. N. Chamberlin of the telephone company, who with Vice-President C. E. Fleager, had gone to the barge to watch the work. The long distance operator, "who always gets her man," transferred the 3,000-mile call to Mr. Chamberlin, out on San Francisco Bay.

Diver Reed was one of the squad of divers who saved a hospital ship from foundering with its precious human cargo during the World War. He also assisted in raising the submarine S-51, sunk off Rhode Island.

A diving bell motion picture of Diver Reed would tell a story of tense interest, as he carries on his work of locating and cutting cables on the bay bottom.

To cut a cable he must have as great freedom of action as possible, and that means slack water, and no tides. But in

Illustration of Telephone Connection Between Diver William Reed and Division Construction Superintendent F. O. Edmunds.

the hour and a half needed to cut a 1200-wire cable and direct raising its ends to the barge for splicing and moving 1,000 feet north, there is the risk that the diver will be caught in the swift bay tide, which swings along at five miles an hour.

He was caught that way one day a short time ago. The tide was beginning to pull at his suit and to impede his hands. Gritting his teeth, determined to finish his job, he wrapped one of his legs around the iron saw horse and kept working.

But the swirling tide made a plaything of his safety rope; it entangled. When he finished his work, and was ready to

General View of the Area of San Francisco Bay in Which Cables Are Being Moved 1,000 Feet. Yerba Buena Island is Shown at the Right and the Tower of the San Francisco Ferry Building in the Foreground.

ascend to the surface, he was caught. Making a quick decision, he proved the courage that has been his during 22 years of diving. He cut the safety rope!

Only the rubber hose supplying him with air was left now by which to pull him to the top. A weak spot in the hose, a jerk of the tide, a split in the rubber and water would have filled his diving suit. Then, goodby William Reed. But the rubber hose did not break and he was pulled to safety.

So swift has been the tide at other times that Reed, dragging an electrical "detector" behind him to find a cable sometimes buried 15 feet in mud, has had to crawl on his stomach to keep from being carried away. At other times to uncover a cable, found by the detector under mud, he digs away the mud with his hands, or if too deep, washes it away with the 100-pound pressure nozzle connected by hose with the powerful pump on the telephone barge. Or again, he grapples for the cable in the mud with his "hay hook," a long hooked rod of steel.

Diver Reed uses his tools under water, in inky darkness, with the skill of many a man in the open air. Raising the cable, to the iron saw horse, he takes his hammer and two drift pins resembling chisels and pries up the quarter inch strands of steel armor. He cuts the strands, one by one, with a pair of bolt cutters.

Then he takes his knife and cuts through the quarter-inch layer of jute surrounding the lead sheath. The ⅛-inch lead sheath and the 1200 wires are then cut through with the hacksaw.

Before beginning to cut the cable he ties two steel ropes to it, one on each side of the place where he is to cut the cable. Then as soon as the cable is severed, he pulls a rubber bag over each end to stop the water from penetrating far into the paper-insulated wires. The bags are fastened tightly with marlin, a heavy cord. Then he telephones to his chief to start raising the ends of the cable.

Code signaling between the barge and the 26-story telephone building is one of the vital phases of the work. Instant word of damage to a cable must be flashed between Division Construcion Superintendent F. O. Edmunds on the barge "Pacific" and land headquarters.

Signal lamps equipped with a code key are used, one being mounted in the window of a room at the top of the telephone building, as shown in one illustration, and the other on the barge "Pacific." The operator on the barge keeps in constant communication with land headquarters by means of the code signal device, which is operated with long and short flashes of light from the signal lamps.

Pacific Bell Advances Building Project to Aid Unemployment.

As a means of helping the unemployment situation in San Francisco, Calif., the Pacific Telephone & Telegraph Co. has announced plans for the immediate construction of a new central office building which, with equipment, will cost about $2,500,000. The new building will be erected at the southeast corner of Pine and Steiner Streets and will house the West, Walnut, and Fillmore central offices.

Excavation work has now begun and construction of the building will follow at once, according to H. D. Pillsbury, president of the Pacific Telephone & Telegraph Co., who stated that contracts have been awarded. The building is scheduled for completion in May, 1932, and installation of equipment will then begin.

President Pillsbury, in announcing this new construction, said:

"This new building and installation of equipment, originally scheduled for 1933, is one of several projects throughout the Pacific Coast that the telephone company has advanced from 12 to 18 months. This advancement of construction, which includes new and replacement projects, is a program dedicated not only to sound economic considerations, but to the telephone company's playing its full part to aid in this time of slackened employment.

To do this we have filled in the construction gap, caused by retardation of telephone growth, by judiciously proceeding with extensions predicated on sound engineering and economic premises which are supported by forecasts of future business trends. In total, on the Pacific Coast, approximately $10,000,000 of construction has been so advanced by the telephone company.

As a result of a material reduction in volume of business, the company found itself with a large force surplus, and our employes have met the situation largely by the spread of work under reduced time schedules in order to keep the maximum number of employes on the payroll. The number of additional employes we have been able to keep on the payroll as a result of this distribution of work, has averaged about 1,450 per month during the present year.

In addition to distributing the available work to as many employes as possible, overtime, except for emergency work to protect the service, has been practically eliminated so that a larger number of employes might be given employment.

In our day-to-day operations, as well as in our construction program, it is our policy, through our employe retention plan, to render all possible assistance in doing our full duty in meeting the employment problem. Through the spread of work and reduced time schedules, never was there a finer example of the great tradition of our service than the unselfish expression of our employes in aiding the other fellow, the company and the community."

Rising Prices Relieve Tension

Prospects of Increased Income as Result of Rising Prices for Farm Products Are Changing Farmer Psychology—Companies in Middle West Encouraged in Fight to Keep High Standards

Rising prices for farm products in the Middle West markets have come to the relief of the sorely-beleaguered telephone companies, which have been having to put up a stiff fight to retain farmers as patrons and to combat radicals who have been fomenting feeling against the companies in various rural centers and organizing for the purpose of mass protest and action.

The farmers stand to increase their income by millions as a result of what has taken place, and dollar wheat and much higher prices for corn are freely predicted. This has changed farm psychology entirely, and also robs him of his principal argument that as his income has been materially cut down, the telephone company owners ought to consent to have theirs reduced.

While the battle is not over yet, telephone company officers are much encouraged over the situation. They have had to maintain flying squads that went into action on short notice, wherever trouble appeared to be brewing. They did effective work in breaking up a number of insurrections in process of formation, where the socialist leaders had planned boycotts or were trying to sign up all farmers to a demand to reduce rates or take out the telephones of every farmer.

In Nebraska, where the battle has been one of the fiercest, the state railway commission was an efficient aid. It announced that under the law and court decisions it would have to give telephone companies rates that would yield a reasonable return, and that it would be useless for farmers or farmer organizations to petition for reduced rates unless they were able to show that the companies were earning more than the law gave them. It also pointed out that there was no possible relation between farm prices and telephone rentals.

The Nebraska Telephone Association has been of great assistance in arming the telephone company spokesmen with facts and arguments. It got out a special bulletin not long ago in which it listed four important facts that the farm patron should know. These were as follows:

That the telephone business is operated on borrowed money; that more than half of the income goes for wages; that equipment in service now was bought and installed in previous years and the investment in it is there; that the companies are obliged to extend their plant to serve the public and must have credit to get the needed money at a reasonable price, as pre-

(*Please turn to page* 42.)

The Responsibilities of a Chief Operator

Only Constant Study and Observation Will Enable Chief Operator to Satisfactorily Fill Her Many Duties—Display Pleasant Personality When Contacting Subscribers—Paper Read at Traffic Conference of Illinois Telephone Convention

By Mrs. Wilma Buchholz,
Chief Operator, Western Illinois Telephone Co., Aledo, Ill.

Responsibilities of a chief operator! My, doesn't that cover a vast territory? The providing of satisfactory telephone service in your community 24 hours a day, every day in the year, is a large job and isn't this, in short, the responsibility of a chief operator? I believe you will agree with me that it is. But it takes so many things to make this satisfactory service which she is really responsible for, that I will only try to touch on the most important ones. I believe it will be a little easier to find out what it takes to make a successful chief operator when we have her responsibilities.

Cheerfulness, sense of observation, perseverence, pleasing personality, and the three main essentials a chief operator first learned when she became an operator—courtesy, accuracy and speed—are the oils that keep the ball bearings of good telephone service in working order. And the one characteristic peculiar to all good chief operators is the quality of being ready and willing to serve. A chief operator may be courteous to the extreme and yet lack cheerfulness.

Someone has said, "Cheerfulness is the happy faculty of expressing thoughts so that others enjoy hearing them." In telephone work, it is the ability to leave the subscriber with a smile as he hangs up his receiver.

A pleasing personality must be displayed in dealing with your operators, subscribers and co-workers. A harsh tone of voice or even a little hateful word will do more harm than a whole day's lecturing will do good. Think twice before you speak, put yourself in the operator's place and look at the situation from her point of view. We often hear so much about "the voice with a smile," and it usually means in dealing with subscribers. But here is a mighty fine place for the chief operator to use it not only with subscribers but her operators as well.

How far do you think a chief operator would get if she came to work with a long face, started relating her family troubles to the operators and sat with a grouch on all day? The girl who feels a dislike for her work as she starts to business should find out what is wrong. If we force ourselves to go through, we may hold down the job, but will we make a success of it?

The efficient worker is the one who doesn't let her work get ahead of her and does it happily and enthusiastically. We must not make the mistake that smiles were made for leisure hours; we need to carry them to the office with us. I like to see a chief operator come to work with a cheery "good morning" and a smile for all of her girls.

Chief Operator Must Be Observant.

We are constantly trying to make our service better—as nearly perfect as is possible. In order to know how near we are to this mark, we must be observant. As far as a subscriber is concerned there are only two essentials that make for good telephone service—accuracy and speed. To be accurate and speedy we must not have wrong numbers, cutoffs, wrong reports, slow answers and recalls.

Some have developed a keen sense of observation. They have two kinds of eyes, physical eyes and a mind's eye. When supervising or teaching supervisors, we must teach them to be always conscious of what is happening in the operating room, whether it is seen with the physical eye or the mind's eye. A chief operator can do this by keeping her mind on the operations of the operators and asking herself if they are right or wrong in their phrasing and tone of voice. With training this is not hard to do; it is accomplished with searching and checking, first, for one or two irregularities; then gradually we see anything that is wrong. We must keep our mind on what we are doing.

There is a tradition in telephone work that dates back almost to the very beginning, "The message must go through." A telephone operator sits at her switchboard through all kinds of danger, not because we have asked her to, but because she has been taught perseverance from the start. We stick, no matter what happens, if the message can't be put through one way, it can another.

The three essentials we learned as student operators—courtesy, accuracy and speed—must still be practiced but with even more tact than before as we are now a teacher or leader. And remember, "As the head of the institution, so is the institution." When working with our operators we should watch our own conduct, operating practices, cord handling and voice work. Above all, we must not let personal feeling enter into our work; in telephone work we cannot have a "teacher's pet," which we so often used to think the teacher had in our school days.

The duties of a chief operator will vary, of course, according to the size of the exchange. In a large exchange she is held responsible for the traffic department, which includes the service, handling of equipment, coaching, service irregularities, and the appearance of the traffic department, with assistants and supervisors to help her. As we go to the smaller exchange, she is still responsible for the traffic department. She has added duties, however, such as employing and teaching new operators, perhaps without any help. In the still smaller exchange the chief operator "does it all"—traffic, cashier work, and plant records.

An operator who has to be a combination of all of these duties must be able to handle them as a group. I have known girls who might make a good cashier but not a chief operator, and vice versa. So a company employing someone to fill both positions must be careful of its selection.

I believe that if I were one of these combination girls I would take care of my traffic department first, when coming to work. Probably a commercial manager would not say this, but without first-class service we cannot hope to have much of a gain in revenue. Build up your service, then the revenue will come of its own accord. If service is poor, we cannot install new telephones or increase our toll business.

When first coming to work, then, find out the troubles on hand and make the proper reports. Next comes the straightening and dusting of the operating room. Our operating rooms are supposed to be open to the public, at least a part of the day, so we never know when company is coming, and I don't like apologies for something that can be avoided.

Old Paths Are Safest and Surest.

We have a kindly and welcoming interest in new schools of thought and new codes of conduct. We demand new philosophical theories, new cults, a new order of society, new laws.

Not in new and strange doctrines of any sort, but in the faith which gave to our mothers and fathers their contentment and their guidance to the good life—there lie the old paths which are safest and surest for our conduct to the land where our restless souls shall find peace.
—Frederick C. Ferry, President, Hamilton College.

See to it that you are always ready for company. After taking the traffic problems in hand, then start on your commercial work and plant records, but always keeping an eye on traffic. Here is where those two kinds of eyes come in handy.

Technical Knowledge of Chief Operator.

Our daily task can be a dull, uninteresting grind, carried on because of the necessities of life, or we can enrich our lives and gain a fuller understanding of others through our business contact with them. The latter is possible in telephone work, especially so in the traffic department.

A chief operator should thoroughly understand her work and be able to answer any question an operator may ask her. Do you thoroughly understand your work and are you able to give this knowledge to your operators so that they, in turn, will be successful operators because of your teaching? If you can, then you have some good points ahead of some of the girls that are elected chiefs.

Only constant study and observation will gain you this point, also hard work. As it has been said, "Hard work is the golden key to success." Any chief operator who is asleep on the job cannot hope to get any place. Most of us must be checked up on more or less by our employer or some one "higher up" with whom we come in contact.

You and I are the ones most interested in our jobs. It's good common sense if we check up on ourselves now and then to see where we stand. We need to look at ourselves in the mirror and say, "Well, what have you got to say for yourself?" Remember, you are the head of the traffic department and are responsible for the kind of service given by that department and in order to give the kind of service the people want, and the kind your company expects you to give, you must know your work.

If the chief operator does the employing, she must be careful in selecting her help. She should consider every applicant separately and carefully. Consider her age (best between the ages of 17 and 25), character, experience if any, height, eyesight, hearing and education. A chief operator, even though she does not do the teaching herself, should see to the teaching and coaching of new operators.

How to Instruct New Operators.

When you or your supervisors stand back of the girls, have a definite thing in mind, watch carefully every movement the operators make in their operating, correcting them when it is necessary, but be careful how you do it; use a cheerful, helpful voice, so the operators will feel more like doing what you ask of them. You know, girls, it is the way a thing is said that counts most and leaves the longest impression.

Mistakes are made in all offices. Operators have always had to be corrected and always will. But there are right and wrong ways of correcting them or giving them new instructions. The average girl wants to do right; she gets a real satisfaction in doing her work well. It is up to us to develop and help her.

No two girls are alike. We should study each girl separately, to find out what kind of a girl she is and determine the manner in which we should approach her. In studying her we can usually class her among the careless or indifferent, the nervous, the unwilling or stubborn, and the willing girl which we like all our girls to be.

There is a different way to approach each class of girls, but I shall not discuss that. If an applicant is accepted, see that she is made acquainted with all the girls and helped to feel at home. In the smaller exchanges it is a part of the chief operator's work to teach the new operators. If so, start them in right and they will always be right.

Encourage and compliment them in their work as well as correct them. Show them how their headset is to be wrapped, adjusted properly, one inch from the lips, her compartment for her headset, and I might say here that I hope every exchange has headset compartments. If you have not, tell your manager you must have; point out to him how much easier it is on a set to wrap it and lay it away rather than throw it on a chair or hang it up.

The Handling of Equipment.

We have equipment in our office that costs thousands of dollars and it is left for the chief operator to care for. That is a big responsibility itself. The management installs new switchboards, each part costing several dollars, tells us how to care for it and then it is up to us to do it and see that our operators do not abuse it.

Suppose that in our home we have a piece of furniture that cost several hundred dollars; we would see to it that no one took a pencil or pin and made marks on it or a knife and cut their initials in it. Yet I have seen several switchboards cut all over with initials. Where was the chief operator when this was going on, or why didn't she instruct her operators before it was too late?

Proper cord handling is a very important factor in transmission and switchboard maintenance. You have been told many times of the way in which cord is made of tiny fine wires and you have been taught the correct way to handle these cords to keep these wires from breaking. I wonder if we are all practicing it by teaching our operators the correct way of handling them?

Anything that irritates me is to go into an exchange and see the operator pull a cord out and let it swing where it will, having no feeling for the girl next to her, as to whether she gets hit in the eye, or the parties who may use the same pair to talk over before they discover that they have been cut off, or the switchboard maintenance man who has to repair the cord. It is just as easy to grasp the shell of the plug and then no damage is done.

Service complaints are also handled by the chief operator. A subscriber never complains unless there has been an irregularity somewhere in the handling of his service and he is dissatisfied. It is then our duty to control ourselves, to resist the temptation of speaking as we are spoken to.

Always Be Cheerful to Subscribers.

Instead of being angry, make the subscriber feel that we are glad of the opportunity to do something for him and make him understand it is a pleasure to be of assistance to him. The easiest mistake we can make is "firing back"; it is natural for us to give as we take, but we must ignore his remarks and answer in a courteous, cool-headed manner. It might be possible to shame him into thinking we are worthwhile after all. It brings us right back to the human part of our work—cheerfulness, sympathy, and agreeableness—which we must train ourselves to maintain. The main thought is not to dismiss a dissatisfied patron until he is a satisfied one.

Make frequent use of a bulletin board, post records, clippings and notices so that the operators always have something new to read. Keep the operators interested in their work and friendly toward each other. I have started in our office "a phrase a day," that is, each day we specialize on some phrase. All operators have been taught the phrases, codes and subsequent attempt times, but they get neglectful and need to review them occasionally. So I type a phrase and put it on the board in front of the operators and they must use this phrase correctly before it is changed for another.

Just remember, girls, we are elected chiefs to give service and we are responsible for the quality of service given the public and we should bear in mind that the company is judged by the service rendered by the traffic department. Our service is only as good as the public thinks it is and it is just as good as we girls make it. Quite a responsibility, isn't it? Are we big enough to keep in mind and practice the one big thought, "Service first, last and always"?

Denver's Federal Building Has Largest Government Switchboard.

The largest United States government private branch telephone exchange outside of Washington, D. C., is now located in the newly-completed federal building in Denver, Colo.

It serves both the federal building and the post office building near by. It is also the largest private branch exchange switchboard in Denver, with the exception of the one used in the offices of the Mountain States Telephone & Telegraph Co.

Here and There in Telephone Work

Nickel Buys Bigger Value in Improved and Speedier Service.

In this day of shrunken incomes the public is particularly interested in securing full value for every expenditure. The advertisement, reproduced on this page, of the Ohio Bell Telephone Co., which directs attention to the "big nickel's worth" received in exchange for every nickel spent for telephone service, is, therefore, very timely.

Says the advertisement:

"The Wise Woman Says—'That's a Big Nickel's Worth.'"

A nickel is the most you possibly can spend for a telephone call in town. Most calls cost less than that. But your telephone nickel buys bigger value today because of improved quality and greater speed of service.

Here are just a few of the many things your telephone nickel does for you daily:

It enables you to take advantage of an advertised bargain.

It brings the doctor quickly in case of illness.

It eliminates worry when you call your husband and family.

Your telephone is the one household servant you can always afford to keep. It does so much work for so little money."

THE WISE WOMAN SAYS—
"That's a Big Nickel's Worth"

A NICKEL is the most you possibly can spend for a telephone call in town. Most calls cost less than that. But your telephone nickel buys bigger value today because of improved quality and greater speed of service.

Here are just a few of the many things your telephone nickel does for you daily:

IT enables you to take advantage of an advertised bargain.

IT brings the doctor quickly in case of illness.

IT eliminates worry when you call your husband and family.

Your telephone is the one household servant you can always afford to keep. It does so much work for so little money.

BEST SERVICE AT LOWEST COST TO YOU

THE OHIO BELL TELEPHONE CO.

Reproduction of Advertisement Used Recently by Ohio Bell Telephone Co. Throughout Its Territory.

Fashion Show Opportunity to Show Telephone Development.

The Streator Telephone Co. of Streator, Ill., recently took advantage of a fall fashion show to display "fashions" in telephones.

The merchants of Streator held a fall jubilee during the week of Septetmber 28, showing a full display of fashions. The telephone company placed a display, shown in the accompanying photograph, in the window of one of the prominent stores.

The evolution of the telephone from 1880 to the present time was shown. Telephones of every description were included, showing the various stages of development from the very beginning of this form of communication down to the present day.

Among the novel devices was a German hand set of 1900, a heavy instrument of battery control. There was also a number of early type automatic telephones, as well as the never-to-be-forgotten "Owl phone," with the two bells accounting for the strange name of the old instrument.

P. B. X. Current Supply; Cadmium Test of Storage Cells.

By JOHN A. BRACKEN.

The E. M. F. and specific gravity of a P. B. X. storage battery may test as satisfactory and yet the battery capacity may be very low. This fault arises because either the positive or negative plates within a single cell or several cells may not be charging or discharging properly.

If either does not completely charge and discharge, the capacity of the cell can only be equal to the capacity of the faulty positive or negative plates. This means cells will indicate a healthy condition when E. M. F. and specific gravity readings are taken, but the one cell will show a lower E. M. F. on discharge and the specific gravity will fall rapidly. Fig. 1 shows the method of making the measurements.

To determine the cause of this, the cadmium test should be made in order to find that during charge and discharge the other out which set of plates—the positive or negative—is defective. Commercially pure zinc serves best for making the test, but as this is very difficult to obtain, cadmium is used as a substitute.

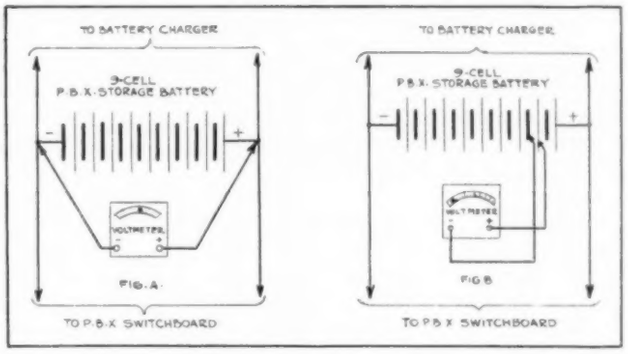
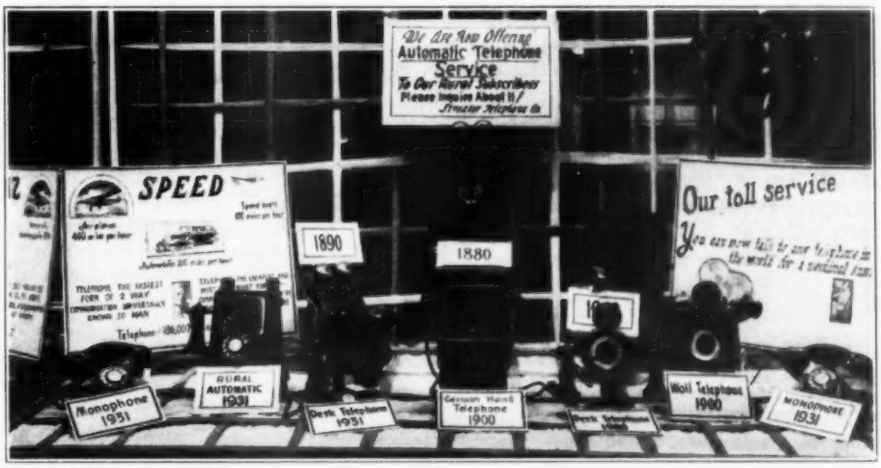


Fig. 1. Connections for Obtaining Voltage of Battery When on Charge and Preliminary to Taking Cadmium Test. Fig. A. Testing All Cells; Fig. B. Testing One Cell.

Cadmium is found associated with zinc ore. Commercially it is obtained as a by-product in zinc smelting. Cadmium is a silvery white, lustrous, ductile metal, harder than tin and of fibrous texture. Cadmium tests will tell more of the actual condition of a cell than an hydrometer. The cadmium test will also indicate the following conditions:

1. When the plates are not well formed.
2. When the plates have lost their porosity.
3. When there is insufficient active material.
4. When the plates are sulphated.



Window Display in Store in Streator, Ill., Where the Streator Telephone Co. Took Part in Fashion Show and Jubilee by Showing the Changes in Telephones.

5. When the mixture of electrolyte is impure.

6. When the negative plates are worn out after the positives have been renewed.

The cadmium test is made as follows: Secure a piece of oxydized cadmium rod

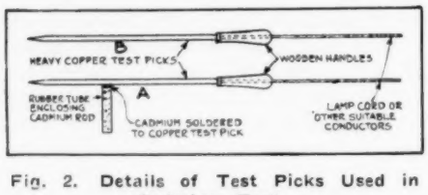


Fig. 2. Details of Test Picks Used in Cadmium Test.

which should be about 3/16ths inch in diameter and from three to four inches long. Solder it to the side of a copper test pick, as shown at *A* in Fig. 2. A second copper test pick is also required, as shown at *B* in Fig. 2.

The cadmium rod should be covered with a rubber tube which has holes cut in it. The rubber tube allows contact of the cadmium and the electrolyte but prevents the cadmium from touching the plates directly. Before proceeding with the work of testing, the cadmium rod should be corroded by soaking it for several days in some of the battery electrolyte until it becomes coated with white sulphate. This sulphate should not be removed, but left on the rod so that its surface may reach a condition that will not change with further action of the electrolyte.

A thorough state of corrosion is of greater importance than the exact shape of the rod. At no time should the cadmium rod be scraped or polished as this will prevent uniform tests from being obtained under various conditions and with varying intervals of time.

When about to proceed with the test, insert the rubber-covered cadmium rod in the vent hole of the cell as shown in Fig. 3. The electrolyte must cover the lower part of the cadmium rod but no part of the rod should touch the positive or negative plates or the plate terminal lugs on the outside of the cell. Connect the two test pick cords to a low-reading voltmeter with divisions to the scale on the left of zero.

If such a voltmeter is not available, it will be necessary to reverse the test pick cord connections at the voltmeter terminals when testing between positive and negative plates with the cadmium rod.

In testing the positive plates of a cell with the battery on full charge, press the test pick *B* hard against the lug connecting the positive plates together (Fig. 4-A) and read the positive to cadmium voltage. In testing negative plates, with the cadmium rod still immersed in the electrolyte between the plates, press the test pick *B* against the lug joining the negative plates together (Fig. 4-B) and read the negative to cadmium voltage. It is best practice to take plenty of time for these tests to allow the electrolyte of the cell sufficient time to act upon the cadmium rod.

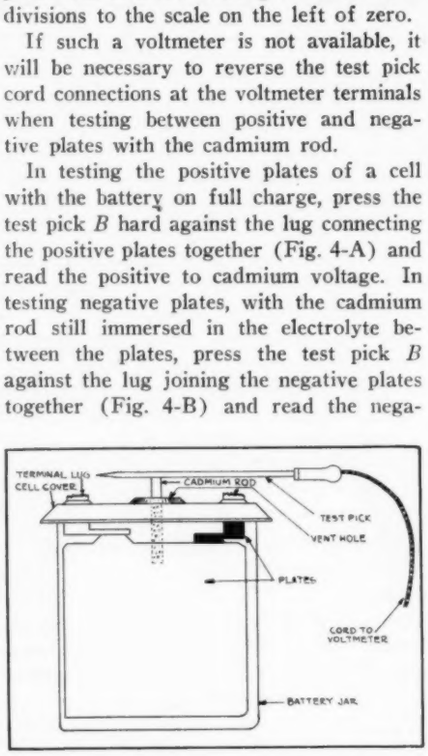


Fig. 3. Method of Inserting Cadmium Rod in Battery Cell for Purpose of Testing.

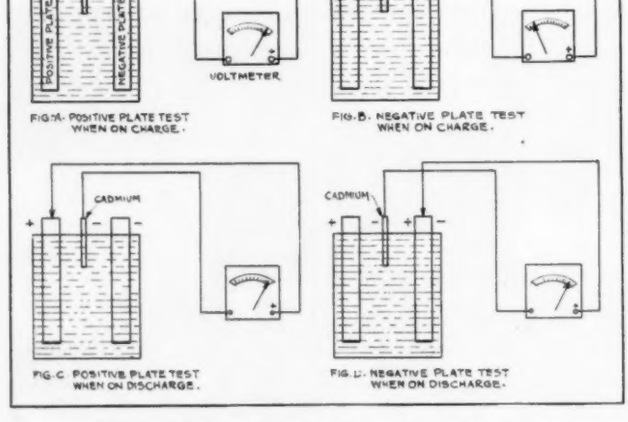


Fig. 4. Method of Testing Positive and Negative Plates of a Cell on Charge and on Discharge.

College Athletic Contests Basis for Company's Fall Calendar.

By M. A. Bartlett.

A college sports calendar is an annual gift from the Mountain States Telephone & Telegraph Co. It appears as colleges throughout the territory are opening—about the middle of September—and the calendar is dated from September through August of the next year.

The calendar, which has become very popular and which is seen for many months hanging on walls of stores and offices and college buildings, and in rooms of college students is, this year, 10 inches by 18 inches. It is headed by a photograph of a critical moment in a football game—the line opening, and the player plunging through with the ball.

Beneath this action photograph on the right hand side is the basketball schedule for 1932, covering both eastern division and western division games, and including Colorado, Wyoming, Utah and Montana universities. Opposite, on the left, is the football schedule for 1931. Dates of games, contesting schools, and cities where the games are to be played are included in the schedule.

DAILY WORK REPORTS

By "Buck."

They've gotta Daily Work Report wot all the fellers gotta make. I tell ya, too, it ain't no sport. It makes the fellers scratch an' rake their domes to try an' figger out jes' how they spent their time that day; an' some'll cuss an' some'll pout an' all agree it ain't jes play.

So, when a hard day's work is done, they'll set there, pencils in their hand, to do this work wot ain't no fun, an' write an" cuss to beat the band.

They gotta show the time they spent at settin' poles an' stringin' wire, an' if some telephones they mend or shoot some bugs or change a tire, they gotta split their time, by gum, between each class o' work they do, then add it up an' git the sum, which hasta check, I'm tellin' you, with total hours worked that day. Oh! How they cuss an' snort an' shout. They sure don't like it, sir.

But, say! It shore helps our accountants out.

I'm tellin' ya, an' this ain't salve, although they stew, they turn 'em in.

The auditor's jes' gotta have these work reports, so hold yore chin! He's gotta know jes' how their time is spent, in spite o' shouts an' snorts. He's got t'account fer ev'ry dime, an' does, from these same work reports.

The center is devoted to telephone information. A college boy, leaning against a wall, is talking to a coed, book under her arm, and very obviously about to be on her way. The background shows a campus scene. Beneath the cut is revealed their conversation:

"I'll see you later then—I have to write the folks."

"Why don't you call them up? It won't cost much."

Students are then urged to call home every week or two, with the claim that it is a lot more satisfactory and quicker than writing. Instructions are given for getting in touch with the family, and there is the information that charges may be reversed if one chooses.

Following this is a table of typical rates to various important points, day, evening and night rates being quoted, with the information in small type that rates to any other points can be secured from the long distance operator; also that the rate per mile decreases as the distance increases.

The calendar, of thin white cardboard, is attractively printed in green and black. Figures of football and basketball players appear at either side of the calendar pad, which is white with green lettering and figures.

The trade mark of the telephone company appears prominently, one-half on each of the two illustrations.

Because of the game schedules, which make the calendar invaluable from September through February, it is displayed far more prominently than the ordinary yearly calendar—a constant reminder of the telephone company, and the proximity of home folks when a telephone is at hand.

"I Wonder Why" of an Observing, Traveling Telephone Engineer.

By Ray Blain.

"I Wonder Why" we do not hear more about the stenographers in telephone work?

It does not seem entirely fair for the operators and linemen to get all the glory. Of course, we always expect the operator to be the heroine in fiction, but the telephone stenographer, besides being very useful, also furnishes a lot of amusement. As any stenographer will tell you, they never make mistakes. (I do know one who admits just one mistake—that was when she married me.)

One stenographer I recall wrote a report which contained a list of material, one item of which was "Jacks, W. E." The firm name Western Electric meant nothing to this sweet young thing, and she apparently did not believe in abbreviating, for she wrote it out "Jack's White Enamel." Another one took some notes about a ringer and wrote it out "Wringer."

Still another changed reactance to "reluctance" and incinerator to "insinuator." In the short-hand characters "hole" must look like "pole," and "tool" like "toll," for they are generally transposed. It is bad when they get the toll instead of pole in the hole.

Another typist changed short to "shirt"—and it is just no fun to be a shirt short, even though most telephone men have had to get used to it during the depression.

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Commission Approves Revised Tariffs for 11 Illinois Companies.

Revised tariffs, filed by the Illinois Bell Telephone Co. and 10 other Illinois telephone companies, were approved on November 4 by the Illinois Commerce Commission. These schedules make readjustments in the charges for service connections and for moving telephones within subscribers' premises in each of the Illinois cities in which the companies operate. The charges affect about 600 cities within the state, including Chicago, and became effective November 9.

In addition to the Illinois Bell company the companies concerned are: Illinois Commercial Telephone Co., Northwestern Telephone Co., DeKalb-Ogle Telephone Co., Illinois Southeastern Telephone Co., Illinois Consolidated Telephone Co., Midland Telephone Co., Atwood Mutual Telephone Co., Arthur Mutual Telephone & Telegraph Co., Tri-County Telephone Co., and the Highland Telephone Co.

The charges affected are those having to do with the installation and moving of service, which partially compensate for the expense incident to this work. Heretofore, these charges have been the same for all cities and for all classes of telephones.

Under the readjusted rates these charges are graded downward, in accordance with the size of the area served, and become lower for extension stations, private branch exchange stations and certain other types of auxiliary equipment. For example, the service connection charge for putting in a business extension or private branch exchange station in Chicago, which was formerly $3.50, becomes $2.25; for a residence extension telephone, which was formerly $3.50, the charge is reduced to $1.50, and the former charge of $3 for moving a telephone within subscribers' premises or for a change in type of equipment becomes $1.50.

Exchange rates are not affected by the adjustments, but there will be a saving to new customers in the initial cost of installing certain type of equipment, and the change is expected to stimulate the use of the service.

Oral Arguments Before Indiana Supreme Court in LaPorte Case.

Oral arguments were heard by the Indiana Supreme Court on November 4 in the appeal of the LaPorte County Telephone Co. from a decision of the St. Joseph circuit court in which a petition for increased rates was denied.

The case, which has been before the Indiana Public Service Commission and the courts for about two years, arose when the petition for increased rates was filed with the commission. Commissioner Frank T. Singleton, who heard the case, wrote an order, but it was rejected and John W. McCardle, chairman of the commission, wrote another order granting the rate increase.

The decision of the commission was appealed by citizens of LaPorte and the St. Joseph county court reversed the order of the commission and ordered that the rates not be changed.

Briefs on the appeal were filed some time ago and oral arguments conclude the case. The court did not indicate how soon it will hand down a decision.

Hearing Asked on I. C. C. Examiner's Report on St. Paul Sale.

Attorneys for the Northwestern Bell Telephone and Tri-State Telephone & Telegraph companies have filed exceptions to the report of Haskell Davis, Interstate Commerce Commission examiner, who recommended that the merger application of the two companies be denied. They asked for a hearing on the Northwestern Bell's offer to purchase the Tri-State properties in St. Paul and suburban territory, and for oral arguments before the commission.

Mr. Haskell's chief objection to transfer of Tri-State stock to the Northwestern Bell was that it was proposed to pay "an excessive" price for Tri-State stock and that such would seem contrary to public interest.

In answer, the attorneys for the two companies say, "Such finding would be without any evidence whatever to support it. The record does show that the price to be paid for the stock does exceed the equity represented by that stock in the physical properties, but there is nothing in

the record to suggest how the payment of a price can be against the public interest when the public is not called upon to pay that price either directly or indirectly."

The attorneys point out that the price for Tri-State stock would not find its way into the rate-base since "rates of both companies are regulated by the Minnesota Railroad & Warehouse Commission, and no rate can be increased without permission of the commission. It must be assumed that the Minnesota commission will properly perform its duties and will see to it that the rates are reasonable regardless of who owns the common stock."

Nebraska Company Asks Rate Reduction for Temporary Period.

The Naponee Home Telephone Co., of Naponee, Neb., has asked the Nebraska State Railway Commission for permission to reduce its telephone rates 25 per cent for a period of three months only. In a letter to the commission, Clifford Redman, manager, says that the prices of farm products are unusually low and that this has curtailed the buying power of patrons, and that to cap the climax nearly every bank in the county has failed, tying up what little funds they possess.

He says that a number of patrons have ordered out their instruments, and that a number more are certain to do so. He figures that if they do this they are lost to the company; and so he proposes, as a matter of policy to help in tiding them over, to reduce their rates 25 per cent.

The present gross rates, subject to a 25-cent a month reduction, are $2.25 for business and $1.60 for residence and rural stations. He says that salaries of all company employes will be cut 25 per cent and operating expenses reduced to the limit.

The company is locally owned. Its last report showed 240 shareholders, with 238 stations in use. Of this number, 170 are in the country. Its annual report for 1930 shows that it paid a small dividend, $390 on a capital stock of $11,850. It has revenues of $4,347.18; operating expenses of $3,808 and taxes of $124.

Nebraska Supreme Court Ruling in Workman's Compensation Case.

The Nebraska Supreme Court has passed on another much-disputed point with respect to workmen's compensation. Anton Kresl, marshal at the village of Dodge, died from a pistol wound sustained while he was at home preparing to go on duty.

His widow claimed that death resulted from an accident arising out of and in the course of his employment, while the village and the insurance company claimed it was suicide. The widow's claim for compensation was denied.

The court said, in effect, that while the rule of law is that where an insurance company defends against a claim on the ground that the deceased killed himself, it has the burden of proof to show that death so resulted.

In a workmen's compensation case the dependents have the burden of proof to show that death arose out of or occurred in the course of his employment. The law giving such compensation limited a worker's recovery to injuries arising out of or in the course of employment. The widow not having sustained this burden, she cannot recover damages, says the court.

Transfer of Rural Line to New York Company Approved.

The sale of the telephone line owned by Anna Crandall and located in the town of Gaines, Orleans county, to the New York Telephone Co. was approved by the New York Public Service Commission October 7. This line serves about 16 stations on a service line basis in the town of Gaines. Only rural multi-party residence service is rendered for which the rate of $18 per year is charged. The line is connected with the switchboard of the New York Telephone Co. at Albion.

The New York Telephone Co. intends to reconstruct the line and put in effect the same rate as is charged other rural subscribers in the Albion exchange, which is $2.25 per month. The subscribers have been canvassed and all agreed to take the service of the New York company.

It is proposed that Anna Crandall sell all of her telephone property to the New York company on or before December 31, 1931, for $250. Expressly excepted from the property to be transferred are all local franchises, lands, buildings, tools, cash on hand and in bank, contracts with subscribers, patrons or others.

The reasons given for the sale are that the present owner wishes to be relieved of the responsibility of the operation of her telephone property; that considerable expenditures are necessary for reconstruction, and that the owner does not wish to undertake the financing of the improvements which are necessary to care for the existing development and provide for growth in order that satisfactory toll and local service may be assured. There is no indebtedness against the property.

The sale of the property will result in a substantial improvement in the facilities and service available to residents of the territory now served by the smaller company and the transfer is in the public interest.

Ohio Cities Telephone Co. Asks to Merge Properties.

The Ohio Public Utilities Commission has set November 17 for a hearing on a joint application for an order permitting the Ohio Cities Telephone Co., of Dover and New Philadelphia, a subsidiary of the Associated Telephone Utilities Co., Madison, Wis., to buy properties of the Ohio Associated Telephone Co., of Marion, and of the Freeport Telephone Co., of Freeport.

In purchasing the properties of the Ohio Associated, the Ohio Cities company proposes to issue $1,484,000 in first mortgage 5 per cent bonds, due December 1, 1961; $332,500 in 6 per cent preferred stock, and 29,500 shares of no-par common stock in addition to $155,978.94 representing the Ohio Associated company's uncapitalized capital expenditures as of November 1, last.

It was stated that the Ohio Associated company's outstanding securities comprise $1,484,000 in first mortgage 6 per cent bonds, due in 1947; $332,500 in 6 per cent preferred stock and 29,500 shares of no-par common stock.

The Ohio Cities company proposes to pay for the Freeport company's properties by issuing 100 shares of no-par common stock, valued at $10,000.

Part of Circleville, Ohio, Company's Refund Unclaimed.

The Citizens Telephone Co., of Circleville, Ohio, which was ordered by the Ohio Public Utilities Commission to return to subscribers the sum of about $20,000 when the commission refused the increased rates collected under bond, reported that $640.72 of that amount has been uncalled for and requested instructions as to its disposal. The company was ordered to keep that amount in a separate fund for future claims on the refunds.

Oklahoma Assessments of Public Utilities Higher.

Final assessments for all public utility and service company properties in Oklahoma, just completed by the state board of equilization, show a total for this tax year of $408,463,642, an increase over last year of $64,240,266.

State officials estimate that each added $1,000,000 in assessments will cost the utilities in added taxes an average of $40,000, and that the larger assessment of $64,240,266 will add approximately $2,560,000 to the tax bill of the utilities operating in the state over what was paid a year ago.

Telephone companies' valuations were raised from $21,687,366 to $27,351,233, an increase of $5,663,967. This, according to estimates, will mean an increase of approximately $225,000 to be paid by the telephone companies in taxes.

Interstate Commission Approves Purchase of Company by Bell.

Acquisition by the New England Telephone & Telegraph Co. of control of the Northern Telephone Co., Fairbanks county, Vermont, by purchase of capital stock was approved on October 31 by the Interstate Commerce Commission.

The Northern company has central offices at Enosburg, Richford, and Swanton.

(*Please turn to page* 46.)

Telephone News From Foreign Lands

News Dispatches Concerning Present Status of Telephone Systems of Foreign Countries--Long Distance Telephone Service Being Extended in China and British Malaya—Contrast Offered in Slow Development in Other Localities

Kiangsu Province, China, to Build Long Distance Lines.

The authorities in Kiangsu province, China, at the lower end of the Yangtsze Valley, are planning the construction of extensive long distance telephone lines, according to a report from U. S. Commercial Attache Julean Arnold, Shanghai, China.

"Kiangsu is embarking upon an ambitious program to build a network of long distance telephones in the province and to connect the system ultimately with those in neighboring provinces," according to the report. "The now unnecessary military telephone lines will be made use of wherever possible. The program, formulated by the provincial reconstruction department, calls for the development of two main telephone systems, one south and the other north of the Yangtsze river. Cooperation of local telephone administrations will be sought while the various districts will be encouraged to install rural services so that they may later be included in the system.

"A Kiangsu Provincial Bureau for Public Utilities has been established and charged with the realization of the scheme, the first stage of which will be the gradual extension southward of the present telephone lines in the 12 important districts south of the Yangtsze river in order to connect with the Chekiang telephone service. The installation of a line joining Yangchow and Hsuchow, north of the river, which is to form the nucleus of the telephone system in Northern Kiangsu, will also be started."

Long Distance Telephone Development in British Malaya.

A communication from United States Assistant Trade Commissioner Donald W. Smith, Singapore, Straits Settlements and Federated Malay States, tells of recent developments. On August 1, 1931, telephone communication was established between the Posts & Telegraphs Department, Straits Settlements and Federated Malay States, and between the Oriental Telephone & Electric Co.'s exchanges in Singapore and various exchanges as far as Kuala Lumpur, Federated Malay States, a distance of approximately 250 miles.

Telephone communication in British Malaya has not kept pace with other developments and the recent opening of the line between Kuala Lumpur and Singapore marks the beginning of a service which local business firms have been clamoring for many years.

The special trunk board in the office of the Oriental Telephone & Electric Co., Ltd., provides a carrier system of telephony which will eventually connect up the zone centers of Malaya, which are in Singapore, Tampin, Kuala Lampur, Ipoh and Bukit, Mertajam (Penang). It is thought that it will be many years before the trunk traffic will be sufficiently heavy to necessitate the provision of cables underground. The present carrier system is transmitted over the existing telegraph circuits.

The present carrier system between Singapore and Kuala Lumpur is adequate for carrying out three conversations and four telegraphic communications between these two points. It is hoped that it will be possible to open up a similar line between Singapore and Penang before the end of the year.

Only One Island in the Azores Has Telephone Facilities.

St. Michael's, with an area of approximately 300 square miles, is the only island in the Azorean archipelago on which telephone service is maintained, according to a communication from United States Vice Consul Charles E. Worman, stationed there. Ponta Delgada, the principal city in the Azores, and Villa Franca do Campo, the second leading communal center on the island, are equipped with exchanges, while several lesser villages are served with public telephones. These public telephones are usually installed in the village post office, and nearly all of them are connected to the wires of the island's telegraph system. Both exchanges, as well as the public telephones, are owned by the Portuguese government and controlled by the General Telephone & Telegraph Service Administration (Administracao Geral dos Correios e Telegrafos), under the direction of the minister of communications at Lisbon.

The exchange in Ponta Delgada is equipped with two commutator boards, each having a capacity of 360 lines. Eight girls and a chief operator are employed, handling an average of about 10,000 calls daily. Twenty-four hour service is maintained. The Ponta Delgada system includes 38,489 meters (one meter is equivalent to 39.37 ins.) of aerial mains, with 348,763 meters of connecting lines, and 1,865 meters of underground mains, with 252,220 meters of connecting lines. Only one aerial cable, 1,200 meters in length and containing 40 lines, is employed.

Underground connections are made of cement with double tubes. Fourteen manhole and 24 completely covered chambers are provided for use in replacement and repair work. Interurban connection is limited to one line of 24,257 meters, telegraph lines being utilized for all other village public telephones.

The equipment of the exchange at Vila Franca do Campo consists of one board with a capacity of 50 lines. Two girls are employed and service is maintained from 7 a. m. to 11 p. m. The system comprises 2,555 meters of aerial mains, with connecting lines totaling 24,643 meters. At present 78 subscribers are served by the Ponta Delgada system, with 152 additional instruments, while 48 subscribers are served by the Ponta Delgada system, with 152 additional instruments, while 48 subscribers and 13 additional instruments are registered at Vila Franca do Campo.

The only instruments employed are of an antiquated manual type, provided with a magneto for signaling and wet cells for power. The rapid deterioration of dry cell batteries in the extremely humid climate of the Azores precludes their use in telephone circuits.

Local officials of the Administracao Geral state that a telephone service is projected for the island of Terceira, and that some material has already been delivered to the island. However, work has not commenced and the whole program has been indefinitely postponed.

Telephone Has Slow Growth in Ethiopia; Three Exchanges.

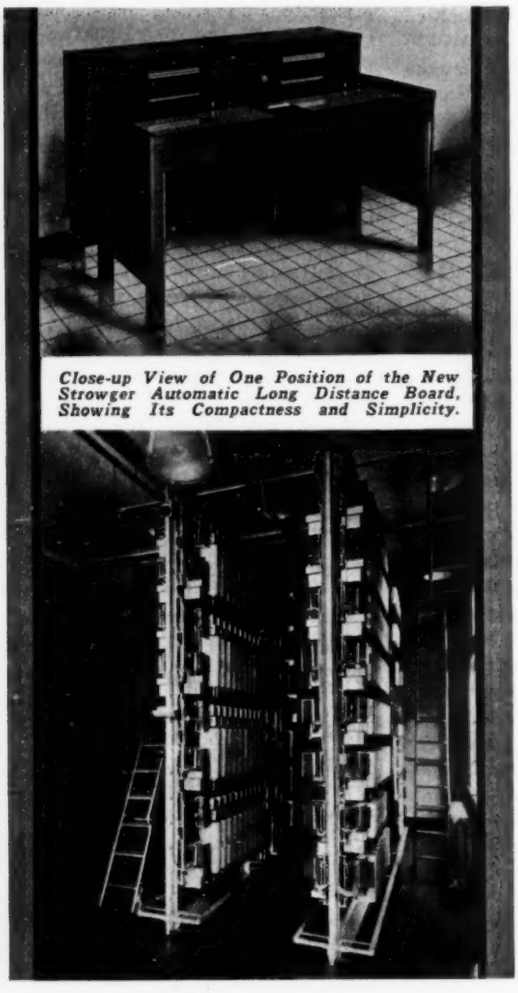
U. S. Vice Consul James L. Park, Addis Ababa, Ethiopia, reports that even though telephones were first introduced about 1896, there are only three real exchanges in active and regular operation in Ethiopia, all located in Addis Ababa. Two are for government service and the third is public.

The exchange in the main imperial palace has 60 lines and a switchboard capacity of 100 telephones. The other government exchange, in the second or royal palace, has 30 lines and a capacity of 50 instruments. The third or public exchange is installed in the post office building and is controlled by the Ministry of Posts, Telegraphs and Telephones. It has two switchboards, each of 100 numbers capacity, the present number of subscribers being 150.

A telephone is installed within or quite near the city for MT$150 (US$37.50). Outside the city, beyond the range of existing wires, the cost is increased in proportion with the cost of new poles, wire, etc., and, of course, divided proportionately if the telephones installed at the same time use the same new line.

(*Please turn to page* 48.)

ELYRIA, OHIO, FIRST TO ADOPT STROWGER AUTOMATIC TOLL



Close-up View of One Position of the New Strowger Automatic Long Distance Board, Showing Its Compactness and Simplicity.

View of Strowger Switches at Elyria Associated with Automatic Toll Board. These Switches Perform Necessary Operations Instantly and Accurately, and Improve Transmission Because of Perfect Connections.

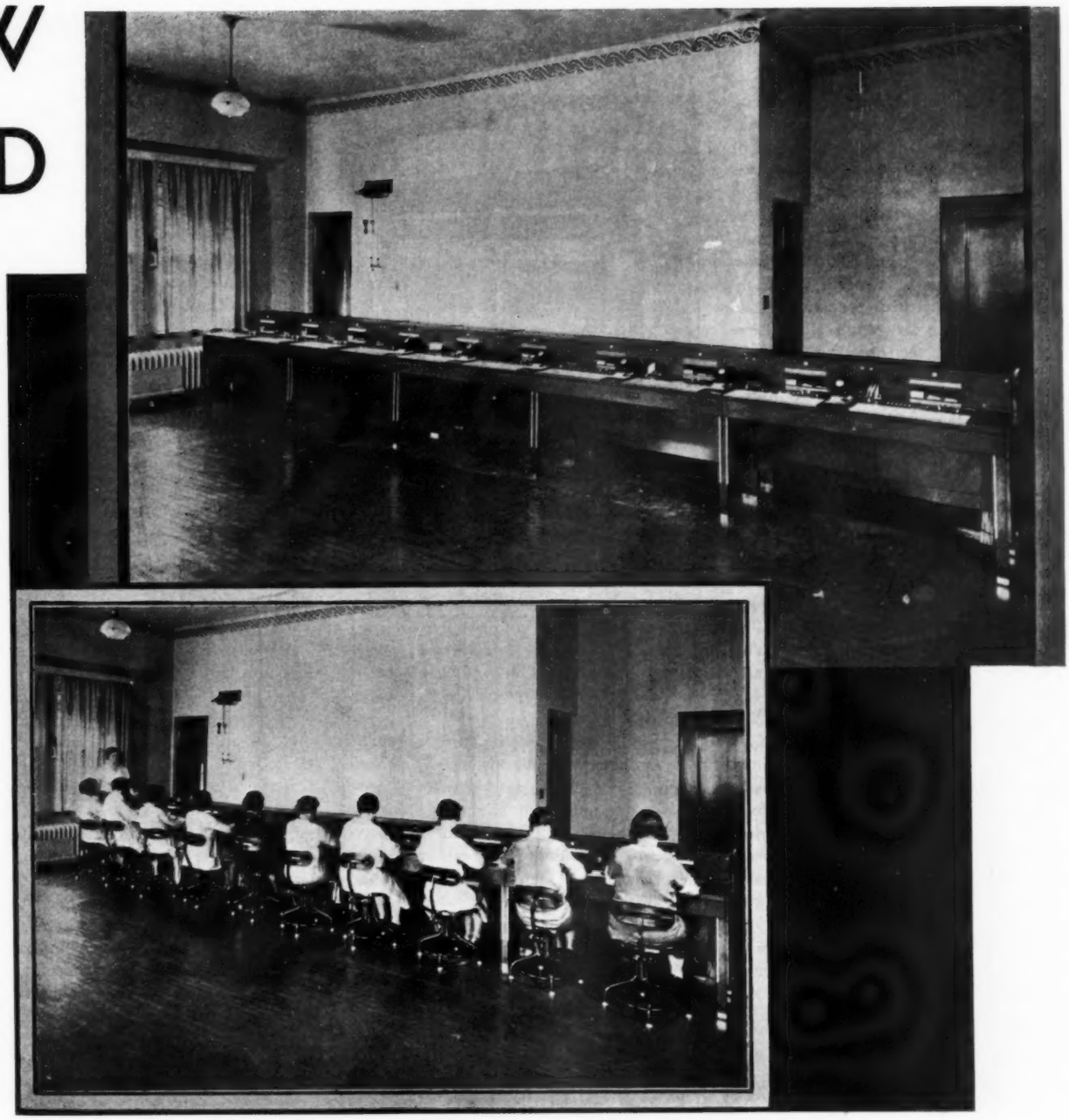
THE recent cutting into service of the Elyria Telepho Strowger Automatic Toll Board marks the completi large-scale commercial installation of this remarkable ment. The Elyria company's early adoption and long u Automatic Dial equipment for its local service is evidenc to provide its subscribers with the best possible commun —and with its installation of the most improved autom ment it takes another step towards that complete perfec which it desires.

The new Strowger Automatic Long Distance Board acterized as being the most important contribution to ment of telephony since the introduction of the Mono phone engineers who have seen it have remarked at its plicity, its compact design and its unparalleled speed an operation. Simple, rapid key operation eliminates at many disadvantages of cord and plug operation, includ interference, "cord reach" fatigue, eye-strain from flash small numbers, poor connections, replacement costs and tear, etc.

A complete summary of the mode of operation advantages of this new board is impossible here, but f will be sent gladly upon request. Every telephone execu neer should acquaint himself with its features.

STROWGER AUTOMATIC DIAL SYSTEMS

GENERAL EXPORT DISTRIBUTOR
The Automatic Electric Company, Ltd., Chicago, U. S. A. and Antwerp, Bel
In Canada · Independent Sales and Engineering Co., Ltd., Vancou
In Australasia · Automatic Telephones Ltd., Sydney
In Japan · Automatic Telephones Ltd. of Japan, Tokyo
In China · Automatic Telephones of China Federal Inc., U. S. A.
In South Africa · Automatic Telephones (South Africa) Ltd., Johannes



Above: New Strowger Automatic Toll Board at Elyria, Ohio, Showing Its Clean-Cut Simplicity of Design.

Below: Operators in Position at New Strowger Automatic Toll Board. There is no Cross-Over or "Cord Reach" Fatigue, Loads are Distributed Perfectly (both for light and heavy traffic), and the Comfortable Seating and Simple Key Operation Result in Extremely Fast, Accurate Service.

Automatic Electric Inc.

Manufacturers of
Strowger Automatic Dial Telephone and Signaling Systems
Factory and General Offices: 1033 West Van Buren St., Chicago, U. S. A.

ASSOCIATED COMPANIES
American Electric Company, Inc., Chicago
International Automatic Telephone Co., Ltd., London
Automatic Telephone Manufacturing Co., Ltd., Liverpool
The New Antwerp Telephone and Electrical Works, Antwerp
Eugene F. Phillips Electrical Works Limited, Montreal

When communicating with Automatic Electric Inc., please mention TELEPHONY.

"Dial Tone" Now In Elizabethtown, Ky.

Handsome New Telephone Building Houses 400 Lines of Strowger Full Automatic Equipment and 60 Lines of S. A. M. X. Equipment, Serving Approximately 900 Telephones in Elizabethtown, Ky., and the Surrounding Rural Area

By L. L. Ruggles,
Sales Department, Automatic Electric Inc.

On August 27, 1931, the citizens of Elizabethtown, Ky., found that the now well-known "dial tone" had taken the place of the familiar "Number, please?" and that henceforth the entire telephone system of this progressive Southern city would be operated on an automatic basis. The conversion to the new method of operation was completed with a smoothness that indicated weeks of careful preparation and thorough planning.

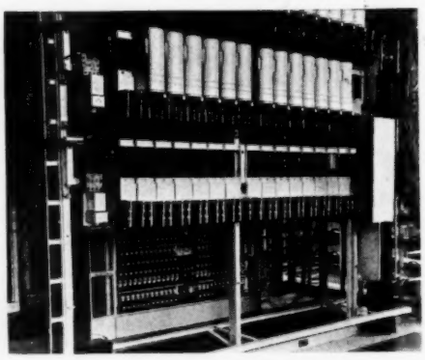
Justly proud of the excellent new exchange building and the modern automatic equipment installed within, the Southern Continental Telephone Co., which owns and operates the Elizabethtown system, had further cause for congratulation. In the first place, the change to automatic operation had been undertaken only after a thorough canvass of the telephone users of Elizabethtown, as to their willingness to pay a slightly increased rate for the modern service, showed them overwhelmingly in favor of the adoption of automatic.

Furthermore, when the change was made, the method of paying bills was also changed from a post-pay basis to a pre-pay basis—not only without the loss of a single former subscriber, but with actual added new business to the extent of 113 stations.

This record indicates that telephone users sincerely appreciate any company's efforts to render them a better service; and when acquainted with all the facts, are in practically every case ready and willing to back up the company's undertakings to effect this purpose.

The new telephone building at Elizabethtown is a substantial addition to the city's business section. Of brick construction throughout, the trim facade of the structure is set back several feet from the sidewalk line, the intervening space being heavily sodded and attractively planted with small, decorative spruce trees.

A small canopied entrance porch, with wrought iron railings, leads directly into the customers' room and commercial offices in the front of the building. Of one-storied construction, the ample length of the building permits ample facilities for commercial offices, automatic switchroom, toll quarters and storage space.



General View of Strowger Automatic Equipment in Exchange at Elizabethtown, Ky.

The Strowger automatic dial equipment furnished consists of 400 lines of full automatic apparatus and 60 lines of S. A. M. X. (semi-automatic magneto exchange) apparatus. Self-aligning plunger type line switches are used, mounted horizontally on Type 30 frames.

The Type 30 equipment utilizes a mounting arrangement and frame construction whereby the distributing frame is butted against the equipment frames so that connections between them can be jumpered, rather than cabled. Many advantages are thereby effected, such as saving in cabling expense, more economical and advantageous utilization of available floor space, high flexibility and convenience in traffic rearrangement, and a number of others.

The S. A. M. X. equipment, which is used for rural line operation, is arranged for automatic code ringing of the subscribers on the party-lines, one long attention ring first being given, followed by the code ring.

A new four-position toll, auxilliary and S. A. M. X. board was also furnished by the manufacturer of the automatic equipment. All toll and special calls will be handled here, as well as the setting up of the S. A. M. X. calls coming in from the rural lines still retaining local battery operation.

The storage battery is charged on the full floating scheme of operation, the charging equipment being operated from the commercial supply. Ringing sets are provided in duplicate in order to insure a constant supply of ringing current under all conditions.

New Exchange Building of Southern Continental Telephone Co., Elizabethtown, Ky.

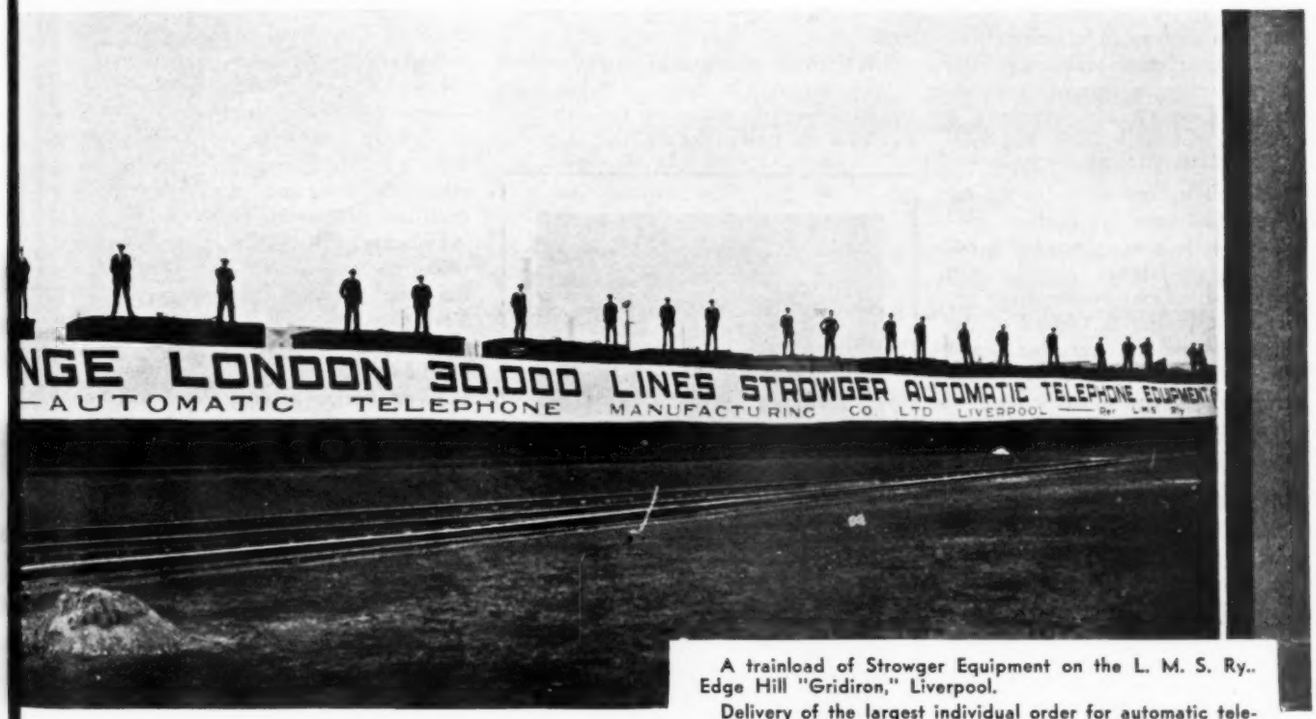
Experimental Service Between Tangier (Morocco) and Europe.

An experimental radio-telephone service, which after a trial period is expected to be made permanent, was inaugurated recently between Tangier (international zone of Morocco) and the principal countries of western Europe, as well as with the cities in the French zone of Morocco, according to U. S. Consul Donald F. Bigelow, of Tangier. Connections with Europe are made via the French government wireless stations at Rabat and Paris and from the latter place the wires are used to extend the service to England, Belgium, Germany, Austria, Hungary, Netherlands, Sweden, Czechoslovakia, Switzerland and Spain.

Connections are also made at Rabat with the government-owned system linking the principal cities of French Morocco. To talk with Ceuta, a city 30 miles from Tangier, the voice is carried by wireless to Rabat and thence, also by wireless, to Paris, where it follows the telephone wires through France and Spain and under the Straits of Gibraltar, to the city of Ceuta.

HONE SERVICE

son of a belted earl."



A trainload of Strowger Equipment on the L. M. S. Ry.. Edge Hill "Gridiron," Liverpool.

Delivery of the largest individual order for automatic telephone equipment yet placed by the British Post Office has commenced, and approximately ten times the above load will be delivered to complete this contract.

EPHONE MANUFACTURING CO., LTD.

owger Works, Liverpool, England

Overseas Distributors

ONAL AUTOMATIC TELEPHONE CO., LTD., London

Transoceanic Communication Facilities

Description of the Extent of Present Commercial Radio-Telephone Service Between America and the Rest of the World — Technical Devices Used to Increase Reliability—Talk Before the Rochester (N. Y.) Engineering Society

By Henry Nicholson,
Rochester Telephone Corp., Rochester, N. Y.

With international broadcasts coming into our homes so frequently now, the feeling of awe that we originally felt when we first heard voices from across the sea has somewhat worn off. And commercial radio-telephone service, heralded at its inception by front-page space in hundreds of newspapers, now receives relatively little publicity. Its scope of service, however, is constantly widening and assuming a normal place in diplomatic, social and business life.

Transatlantic telephone service on a commercial basis had been the goal of telephone engineers for many years, but it became a reality on January 7, 1927. On that occasion an official conversation between President Walter S. Gifford of the American Telephone & Telegraph Co. and Sir Evelyn Murray of the British Post Office formally opened it to public use.

Extensions were rapidly made and by the end of that year the entire United States, as well as many cities in Canada, Cuba and Mexico, had been linked to all parts of England, Scotland and Wales. It was a year later, or January, 1928, before extensions from the London terminal to the Continent began to be made. Today a score of countries in Europe as well as Argentina, Uruguay and Chile, and most of Australia, can be reached from the United States by the transatlantic telephone. Nearly nine million telephones, or one-quarter of the world's total 35,000,000 telephones can be reached by radio from this country.

During 1930 the radio telephone made great progress in all parts of the world. Due to the addition of 11 new direct radio circuits between various countries and 92 contributing land line circuits, there were at the close of the year 177 different international telephone connections operating in the world. Three groups of countries connected by radio-telephone during 1930 stand out as of leading importance.

The first of these established during the year was between North and South America, linking the United States, Canada, Cuba and Mexico on one end with Argentina, Chile, and Uruguay on the other, through facilities of the International Telephone & Telegraph Corp.

The second is comprised of the three new circuits between Europe and South America. On the European end these three circuits operate from Paris, Berlin, and London to Buenos Aires, feeding into land lines to Chile and Uruguay. At the European end land lines connected 17 countries into these circuits. These are Austria, Belgium, Czechoslovakia, Danzig, Denmark, Finland, Italy, Hungary, Latvia, Lithuania, Luxemberg, Netherlands, Norway, Poland, Spain, Sweden and Switzerland.

The third of these groups is the London-Sydney circuit, a distance of 9,192 miles and its subsequent extension, through London, over the transatlantic circuit to North America. Australia has also connected with New Zealand which will become part of this network.

Mr. Nicholson Discusses History of Radio-Telephony Between Various Countries and Its Rapid Development in 1930. He Particularly Mentions the Connections Between North and South America, Europe and South America, and England and Australia.

Other new direct circuits opened during the year were between Rio de Janeiro and Paris, Berlin and Madrid; Berlin and Java; Paris and Morocco; and Australia and New Zealand; with several other European countries tied into these services.

Other services in the course of construction are for additional South American connections from Brazil, Chile, Peru and Colombia, to the United States and Europe; between the United States and Hawaii, Japan, Philippines and Australia; also British Empire connections with Canada, India, and South Africa, as well as with Japan and China.

Figures for 1929 indicate that an average of 50 persons a day used the radio-telephone service from this country. The greatest number of calls for any single day in 1930 was on Christmas when 207 calls were made from the United States to Europe, South America, Australia and the S. S. Belgenland at sea.

Rochester contributes its full share to overseas telephone traffic, about 40 transoceanic calls being made from this city in 1930. Stromberg-Carlson Telephone Mfg. Co., B. Forman & Co., and many other local firms and individuals have been consistent patrons of the service.

Calls made from the various homes and offices go first by wire from Rochester to the long distance headquarters at New York City. Then, in case they are routed by the long-wave circuit, the call travels out Long Island to Rocky Point where the radio transmitter is located. Upon reaching Rocky Point the voice electric waves are amplified more than 200,000,000 times for their transatlantic jump to Cupar, Scotland. In spite of this huge amplification, they reach the other side only about a billionth as strong as when they left.

At Cupar, Scotland, they are captured by a radio receiving set and automatically relayed to a telephone line running to London and terminating in the long distance headquarters there. If the call is for a European point, the waves continue by submarine cable under the English Channel and by ordinary telephone circuit to the Continental subscriber. In returning from the European side the voice goes to Rugby, England, where the powerful English radio transmitter is located, and is sent across the ocean and picked up by the American long-wave receiving station at Houlton, Maine. From Houlton the message comes down over a long distance telephone line to New York City whence it is sent to the American subscriber.

But in addition to the long-wave circuit there are four short-wave circuits employed, three to Europe and one to South America. The American radio transmitters of all four short-wave circuits are located at Lawrenceville, near Princeton, N. J. The radio receiving station for short-wave signals coming to America is at Netcong, N. J., also near Princeton. England's short-wave transmitter is at Rugby and its short-wave receiver at Baldock. The South American stations are near Buenos Aires.

It is the amplification afforded by the modern vacuum tubes that makes possible

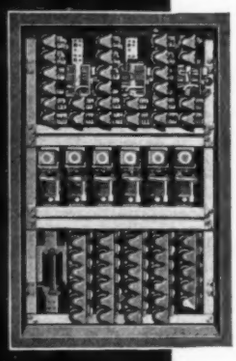
A·T·E·A MEASURING INSTRUMENTS

Accurate in Operation Under All Conditions

A. T. E. A. measuring instruments incorporate simplicity and ruggedness in their design and construction. The weight of all moving parts has been reduced to a strict minimum consistent with strength. The sheet- or cast-iron case adds rigidity and prevents any misalignment or misadjustment with use.

Added to such structural details, only the most simple and direct principles of operation are utilized in these meters. This directness results in greater precision, more satisfactory performance and longer life.

A. T. E. A. meters are the result of manufacturing skill and long experience. Damping is completely dead-beat, and the sheathing of iron or steel provided by the case completely prevents any magnetic interference from nearby cables or apparatus. Furthermore, each instrument is calibrated for the entire range of its scale—resulting in accuracy consistent with any minute peculiarity of the individual instrument.



Low first cost and longer life make A. T. E. A. instruments excellent values. Send today for catalog and prices.

A. T. E. A. METERS INCLUDE:

Dead Beat Moving Iron Voltmeters and Ammeters—Moving Coil Voltmeters and Ammeters —Voltmeters and Ammeters Ferraris System— Alternating Current Wattmeters Ferraris System—Ohmmeters—Insulation Testing Instruments — Instrument Transformers — Frequency Meters — Power Factor Meters — Synchronoscope Meters, etc.

This Type PC Ammeter Is Completely Dead Beat in Action. It Operates on the Moving Coil Principle.

THE NEW ANTWERP TELEPHONE AND ELECTRICAL WORKS S.A.

22 RUE DU VERGER
ANTWERP BELGIUM
Export Distributors
THE AUTOMATIC ELECTRIC COMPANY, LTD.
Chicago, U. S. A. Antwerp, Belgium

Cables:
Strowger-Antwerp
Telephone 938.00

Codes:
A. B. C. 6th. Ed.
5 letter

When communicating with Antwerp Telephone & Electrical Works, S. A., please mention TELEPHONY.

SEED TIME AND HARVEST TIME

By Miss Anne Barnes,
Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

What is the purpose of life if it is not intended to develop character? No matter how unimportant our duties seem to us, we grow through performing them if we do not allow ourselves to harbor the thought, "I'm only an insignificant unit in our organization. I would never be missed if I dropped out."

Suppose every other seemingly unimportant unit in our company entertained such a thought. If we do our bit well and conscientiously, and between times, season our lives with a little regular pleasure, and patiently accept our allotment, we will radiate more helpfulness and happiness than many folks who have lofty positions.

Everything we do and think counts for or against us in character building; whether we aim high or aim not at all; whether we think happy, helpful thoughts, or indulge in spiteful, careless, selfish thoughts. Our thought habits are indeed vital. They either nourish or starve the growth of our character. Our aims are really no higher than our thoughts.

There is so much waste in every life—in time, thinking, effort, and what not. How blind and thoughtless we are not to sense that no effort is worth the making unless it builds our character.

MORAL: The material things we build, such as beautiful homes, fortunes, etc., will not count in that day of accounting unless we have also availed ourselves of every means within our reach to build our character strong, happy and helpful.

both long distance wire telephony and the overseas radio-telephone. However, because it is not possible to insert "repeater" points between terminals on trans-oceanic service the tubes used in the transmitter and receiver are much more powerful than those used on land wires where vacuum tube amplifiers can be inserted at frequent intervals along the telephone line.

Several expedients are used both in the case of the long and the short-wave services to get the utmost out of the transmission facilities. In the case of the long-wave circuit, the carrier wave and one of the two speech-bearing "side-bands" is filtered out before transmission and the entire power concentrated in the single remaining side-band. The receiving stations for this circuit are located as far north as possible in order that they may be more free from static interference.

A wave-antenna is used at the long-wave receiving stations. These are wire lines several miles long leading to the receiving station and pointing directly at the transmitter so as to pick up the greatest amount of signal and the least noise. All these devices make the long-wave telephone station thousands of times as effective as an ordinary broadcast station of similar power would be.

In short-wave transmission the carrier and side-bands are sent intact and the stations are located near the metropolitan centers rather than at some remote northern point. However, the directional principle is maintained. In this case the transmitting as well as receiving antenna face in the exact direction of the cooperating station. These short-wave antennae are smaller and less costly than those used for the long waves. The line of transmitting antenna faces broadside towards the receiving station; and the line of receiving antenna in each case face "edge-on" towards the transmitter.

To increase the reliability of the short wave service, it is necessary to have the choice between several sets of suitable waves for the same channel, the appropriate wave depending upon the season and the time of day the call is made.

When darkness prevails across the entire path between America and Europe, a wave length of about 33 meters is used; when twilight intervenes in the path, a wave of 22 meters is better; and when the entire path is in daylight, 16 meters is utilized. In transmission between this country and South America, geography makes the time of day also the same at both transmitter and receiver, and there can be no variations due to twilight across the path of the radio-telephone call.

Of the three short-wave services across the North Atlantic between England and America, two channels can be operated on any one of the three different wave lengths mentioned. The third circuit to England has a fourth set of waves near 45 meters available. The circuit to Buenos Aires is operated on three different sets of waves. Thus a total of 13 sets of waves are used for the short-wave service and one for the long wave.

Not content with these trans-oceanic radio facilities, and also with a ship-to-shore radio-telephone service on the Atlantic, the American Telephone & Telegraph Co. is planning a special transatlantic telephone cable. This will insure an absolutely secret service, with high quality transmission free from static or fading.

Answers to Traffic Questions Presented on Page 16.

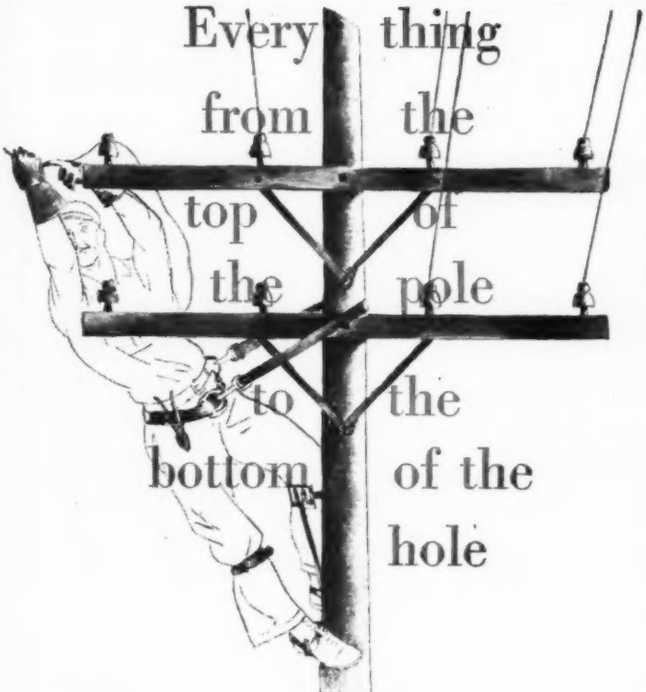
1. The DA-DW item (don't answer and did not wait) may be improved by guarding against the three most common causes which are responsible for this item:
   (a) Failure to fully seat the plug in the jack. The called station usually will not be rung.
   (b) Failure to fully depress the proper ringing key. If, as a result, no station is rung or the wrong station is rung and does not answer, the call is classed as DA-DW.
   (c) Disregarding multiple markings or misplugging, which results in ringing vacant stations.
2. This condition would indicate the necessity for a transfer of lines so that all pay stations will not appear on the same position.
3. This practice is still effective.
4. Ordinarily the toll center operator should not leave the line while taking a call from a small office. However, in some cases it is necessary for her to do so to answer a flashing recall signal, a signal from another operator, or a disconnect signal on which she is responsible for clearing the circuit.
5. The code "UD" is used when the called station reports that they do not know whether the called party will be there today. The code, "u indef" has been superseded by the code "UX." This code is used when the called station reports that the called party is not expected today and they do not know when he will be there.

Young Children Should Be Taught Correct Use of Telephone.

Teaching children to use the telephone has become an important parental duty today. Courses in schools have been inaugurated in European countries and a few parts of the United States, but thoughtful parents instruct their children how to telephone even before they enter school.

The five or six-year-old who is trained in the use of the instrument will not only receive pleasure himself from the knowledge, but in cases of emergency, will be a real help to the grown-ups of the family.

If anything happens to mother, for instance, such as a fall or a fainting spell, the child who has had Daddy's number and how to call it firmly impressed on his mind, may turn out to be the man of the hour.



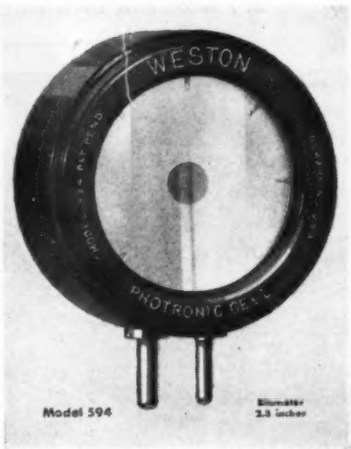
Everything but the man!

It may be a carload of cable or it may be only a roll of tape. But no matter what the need—or how much—one single order to Graybar simplifies the whole process of purchasing construction supplies. . . . Thanks to Graybar, all these separate distribution items can be ordered as one order—billed on one bill—and the supplies assembled as a single or separate unit to suit your individual requirements. In short, Graybar brings coordination to the whole complex procedure. Simplification—economies—conveniences—result. . . . One thing more! Graybar's nationwide distribution system, operating through 76 strategically located warehouses from coast-to-coast, makes these supplies readily available right in your own vicinity.

GraybaR

OFFICES IN 76 PRINCIPAL CITIES. EXECUTIVE OFFICES: GRAYBAR BLDG., NEW YORK, N. Y.

ANNOUNCING *THE NEW*



WESTON

PHOTRONIC CELL

In use and construction, the Weston PHOTRONIC CELL is different—utterly simple—and low in cost.

Revolutionizing in operation, amazing in performance, the PHOTRONIC CELL reduces light sensitive cell applications to a new simplicity. Reliability increased . . . new fields opened . . . present developments advanced. The PHOTRONIC CELL sets an entirely new standard of performance. *Write for Circular YY.*

•

OUTSTANDING FEATURES

- Highly sensitive.
- High current output (approx. 5 milliamperes in direct sunlight—one microampere per foot-candle).
- Operates relays directly.
- Unlimited life.
- No drifting.
- No deterioration.
- No batteries.
- No dark current.
- No readjustments of circuit.
- Non-microphonic.
- Withstands direct sunlight.
- Not easily damaged.
- Nothing to replace.
- Low in cost.

WESTON

ELECTRICAL INSTRUMENT CORP.

576 FRELINGHUYSEN AVENUE . . . NEWARK, N. J.

With the Manufacturers and Jobbers

Restoring Service Following Damage Caused by Tornado.

During the latter part of September a tornado swept through a section of southern Wisconsin, destroying farm property valued at more than $500,000 and ripping communication and power transmission lines to shreds.

The accompanying photographs show an earth-boring machine manufactured by the Highway Trailer Co., Edgerton, Wis., on the job amid the wreckage, restoring revenue-bearing lines to service with a minimum amount of delay.

The machine, mounted on a Ford 1½-ton chassis, digs holes from 6 inches to 24 inches in diameter and up to seven feet deep. Its ability to reach difficult locations and to travel from one wrecked area to another at a road speed exceeding 42 miles per hour added greatly to its other advantages on this particular job of restoring the lines to service.

Automatic Electric Exhibit Has Interesting Monophone Display.

The exhibit of Automatic Electric Inc., of Chicago, at the recent national Independent telephone convention included an unusually attractive display of the latest type monophones in various colors. The stand upon which these instruments were shown occupied the center of the booth, and was artistically decorated with a background of dials painted in various colors, with a special colored floodlight arrangement illuminating the telephones displayed.

As more attention is given color harmony in the home, modern handset instruments in various shades of color are being welcomed by women anxious to enhance the attractiveness of the different rooms in the house. Both for regular and extension use, the instruments have a very strong sales appeal to the buying public.

View of Display of Automatic Electric Inc. at National Independent Telephone Convention. In the Center Can Be Seen the Attractive Group of Monophones in Various Colors, While to the Left and Right are Shown Two Different Types of Strowger P-A-X Units.

The other interesting features of this company's exhibit which have been previously described in detail in these columns, are partially visible in the accompanying illustration. On the left can be seen a Strowger Type 31 P-A-X (private automatic exchange), compactly mounted in a steel cabinet.

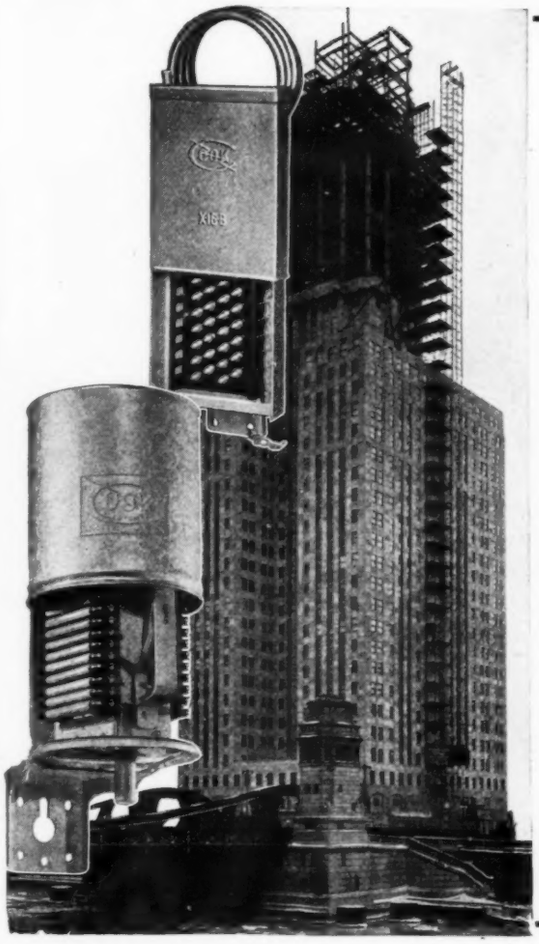
On the right is shown a Type 25 P-A-X, typical of the new sectional mounting now used for the smaller Strowger units, both for public exchange and P-A-X use. Visible to the left in the rear is a typical framework of Type 51 Strowger automatic equipment, designed for public exchanges.

All of this equipment was connected with monophones placed at various points throughout the exhibit, and numbers could be dialed over these telephones by parties interested in seeing just how automatic equipment sets up a call in response to the dial impulses.

Transporting a Record Strowger Automatic Telephone Exchange.

The accompanying illustration marks the inauguration of the transport of some 500 tons of Strowger automatic telephone exchange equipment from the Strowger works of Automatic Telephone Mfg. Co., Liverpool, where it has been manufactured, to Mayfair exchange, London, where it

Views in Southern Wisconsin Showing Earth-Boring Machine at Work Restoring Pole Lines After Wrecking by Tornado.



COOK
POLE CABLE TERMINALS
Built Like the Skyscrapers of this Age of Steel

A pole cable terminal is no better than its foundation —the cable core box is the foundation of every terminal.

The core-box of a COOK CABLE terminal is made of Toncan Iron, formed, assembled, hot galvanized. It cannot warp, check or rot. It is air tight and moisture proof. It provides a perfect chamber for terminating lead covered cable that will satisfactorily serve you beyond the life of the cable.

Insulation of a COOK Terminal is of hard rubber or bakelite. No HIGHER DIELECTRIC VALUE IS KNOWN. Just two points of superiority that insure you years of satisfactory service at a minimum of maintenance cost.

COOK ELECTRIC CO.
CHICAGO

Do You Buy *Batteries* or *Hours of Service?*

COST per *service hour*—not cost per *battery*—is the only way to gauge battery prices. A telephone cell that gives only six or seven months of service is high-priced, no matter what you pay for it. Ray-O-Vac Telephone Batteries cost less because they deliver more hours of service than other batteries. Tests conducted in accordance with U. S. Government standards, as well as records of users, prove that Ray-O-Vacs deliver many hours more actual service than most other makes. And over a period of time, there's a considerable saving in service costs alone. It will pay you to standardize on Ray-O-Vacs. They *last* longer.

FRENCH BATTERY COMPANY
Madison, Wisconsin
General Sales Offices:
20 North Wacker Drive, Chicago, Illinois
Makers also of Flashlight Batteries, Rotomatic and Standard Flashlights and Electric Lanterns

RAY-O-VAC

TELERING
The SUPER-RINGING MACHINE

Trial Orders Invited

Why delay improving your ringing service, when by so doing you reduce your ringing cost?

Negligible Operating Expense

No Radio Interference

Operated by Commercial Alternating Current

Price $44.00—F. O. B. ELYRIA

Sold by Leading Telephone Distributors

TELKOR, INC., ELYRIA, OHIO

WINTER ECONOMY

IT isn't the Battery that makes Battery maintenance expensive. It's the service. The service costs the same for short-lived Batteries as for Storm King Duro Powr. Duro Powr means what it says: more *effective* power and more hours of usefulness, both obtained by calculation and invention.

Duro Powr is the only big Battery with a seamless zinc cup—the only Battery with an airtight top seal—the only Battery that doesn't let moisture in and energy out through soldered joints or defective tops. Add the D-W patented paper-thin insulator and the extra quantity of mix and you have a Battery that you can depend upon for the longest effective life per installation trip.

GENERAL DRY BATTERIES
INCORPORATED

CLEVELAND, O.

Makers of all types of dependable Dry Batteries for Radio, Ignition, Flashlight and General Use.

will be installed for the British Post Office.

The "Mayfair" contract, which actually covers three 10,000-line Strowger director exchanges, the others being "Regent" and "Grosvenor" respectively, was placed by the British Post Office with Automatic Mfg. Co., Ltd., in January last and constitutes a record order for Strowger equipment.

The three exchanges which will ultimately serve some 30,000 subscribers in the western residential area of Greater London, will be housed in a single building in Farm street, which also provides accommodation for a fourth exchange of equivalent capacity to be added later.

Manufacture of the Strowger equipment for Mayfair is already completed to the extent of some 70 per cent, while 50 per cent is actually packed and awaiting transport. Installation on the site has commenced, and the three exchanges will be ready for service towards the end of 1932.

Transport of the equipment from Liverpool to London is being effected per L. M. S. Ry. and the consignment illustrated represents about 10 per cent of the whole.

The construction of Mayfair, Regent, and Grosvenor exchange marks a further stage in the general conversion by the British Post Office of the Greater London telephone network to Strowger working, which commenced with the opening of Holborn exchange in 1927.

MAYFAIR EXCHANGE LONDON 30,000 LINES STROWGER AUTOMATIC TELEPHONE SYSTEM
Manufactured and Consigned by
AUTOMATIC TELEPHONE

View of First Consignment of Strowger Automatic Equipment for the Mayfair Exchange, London, England. This Will Ultimately Be the Largest Combination of Strowger Director Exchanges in Europe Under One Roof.

American Electric Switchboard Ordered for Aransas Pass, Texas.

The American Electric Co., Inc., Chicago, Ill., has received an order from the Texas Telephone Co. for complete new switching apparatus for the company's exchange at Aransas Pass, Texas. The new equipment includes a two-position monotype community central battery switchboard complete with power board and main distributing frame. The switchboard is to be equipped with 220 common battery local lines, 40 rural and toll magneto lines and 25 universal cord circuits.

Aransas Pass, located on the Gulf of Mexico, is a port of commercial importance and is connected to Corpus Christi and other nearby towns by the Texas and New Orleans division of the Southern Pacific railroad. The local exchange is a part of the Texas Telephone Co.'s system under the management of Sam H. Shutt, whose headquarters are at Sherman, Texas.

Personal.

STANLEY H. MANSON, formerly a member of the sales department of the Stromberg-Carlson Telephone Mfg. Co., and later office manager for the Scoville Mercantile Co., of Atlanta, Ga., Stromberg-Carlson representative, was married to Miss Betty Stribling of Atlanta, on October 31.

Following a honeymoon trip in Florida, Mr. Manson will take up his new duties as radio sales promotion manager for S. Ernest Philpitt & Son Stores, radio dealer with five large stores throughout Florida. His headquarters will be at 40 S. E. First street, Miami, and he and Mrs. Manson will reside at Coral Gables, Fla.

Telephones and Exchanges Increase in Northern Ireland.

The number of exchanges now in operation in Northern Ireland is 171, while there are 25,000 telephones in use, this being an increase of some 1,500 over last year. New exchanges have been established at Altamachin, Belleck, Cushenden, Dromore, Garrison, Garronpoint, Groomsport, Tullyhommon, and other places.

Prices in the Metal Markets.

New York, November 9. Copper—Quiet; electrolytic spot and futures, 7c. Tin—Firm. Spot and nearby, $23.37; future, $23.50. Iron—Quiet. No. 2, f. o. b. eastern Pennsylvania, $14.75@16.00; Buffalo, $14.50@15.00; Alabama, $11.75@13.00. Lead—Firm. Spot New York, 3.95c; East St. Louis, 3.75c. Zinc—Steady, East St. Louis spot and future, 3.20c. Antimony—6.75c. Quicksilver—$72.00@75.00.

SERVING CANADA . . .

With a Complete Stock of Telephones, Dial and Manual Switchboard Equipment, Construction Materials and Supplies

We are prepared to furnish telephone organizations throughout Canada with any item of telephone equipment—from the smallest article up to complete installations of metropolitan telephone systems. The products which we distribute are so well known that no detailed description of their high quality is necessary. In addition to this most complete line, we have our own manufacturing and repair facilities—each department is under the supervision of an expert. Consult us before making your next purchase—prices and proposals gladly furnished upon request.

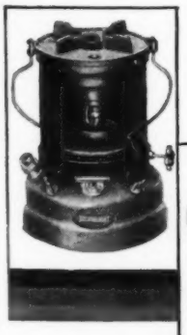
Independent Sales and Engineering Company, Limited

VANCOUVER, B. C.

Representatives in Canada for
AMERICAN ELECTRIC COMPANY INC., Chicago AUTOMATIC ELECTRIC INC., Chicago
THE NEW ANTWERP TELEPHONE AND ELECTRICAL WORKS, Antwerp
AUTOMATIC TELEPHONE MANUFACTURING CO., LTD., Liverpool
THE AUTOMATIC ELECTRIC COMPANY, LIMITED, Chicago
ALTON BATTERY COMPANY, Alton, Eng.

WALL DREADNAUGHT

BLOW TORCHES AND FURNACES



DESIGNED to withstand roughest usage, delivering maximum heat for long periods of time and operating in windiest weather. Also brazed steel double-jacketed compound kettles. Write for information about the DREADNAUGHT line.

P. WALL MFG. SUPPLY CO.
3126 Preble Ave., N. S.
Pittsburgh

SINCE WALL SUPERIOR PRODUCTS 1866

LEICH

Nos. 47-A and 48-A

RINGING CONVERTERS

Operate from 110-volt, 60-cycle power current. Furnish standard voltage ringing current. No radio interference. Fireproof.

Only one moving part. Two current carrying contacts. No critical adjustments. Contact adjustment and replacement can be made by trouble shooter.

Operate on less than 8 watts under no load. Cost of operation between 50c and $1.25 per month.

Trial orders solicited.

LEICH ELECTRIC CO.

Genoa, Ill.

"The first to produce a successful ringing converter to operate from alternating current."

RISING FARM PRICES RELIEVE TENSION.

(*Concluded from page* 18.)

liminary facts the farmer should know if he is to understand about rates.

That the operation of a farm and that of a telephone company have much in common; the farmer has his land and equipment for which he paid a certain sum, as the telephone company has an investment in its service-giving property, and that each has a right to earn on those investments; that where the farmer borrows money to finance his operations in the form of a mortgage, the company borrows on bonds, and that where there is a failure on the part of either farmer or company to pay interest or other sums due, a foreclosure would follow and both be put out of business.

That it being impossible for a telephone company to reduce the amount invested or the taxes on it, there is but one source of economy open, and that is to reduce wages. Telephone workers receive no more than is paid in other lines of business, and the girls are about on a par with clerks and stenographers; that the wages of telephone workers remain steady over a period of years during which workers in other lines share in prosperous times by getting more wages and are penalized by lowered wages only in depressions; that reductions in wages are reflected in the local demand for farm products and make for lower prices for them.

That if it is a question of whether the farmer can pay for the service, it is a personal matter for him alone to decide, but that if he questions whether the service is worth to him what it costs, then the matter is one for debate; in one emergency telephone service may be worth more than it would cost him for a lifetime of service, such as an accident or serious sudden illness necessitating immediate medical attention.

That in considering value of the service the farmer should also take into consideration the cost to him of performing personally the errands the telephone does for him; that the telephone gives him 24-hour protection against any and all emergencies; and that as he would not drop his fire insurance because he never has had a fire, he should not quit telephone service because no emergency has yet arisen.

Other arguments used have had to do with a comparison of the cost of other commodities ordinarily purchased, such as gasoline, cigarettes, gum, candy bars, bread and amusements.

One argument that has been found to appeal to the long-headed farmer is that he should take a longer view of the situation, not seek to measure telephone service and rates by what has happened in one or two seasons, remembering that farm products have had a wide range of prices, most of them meaning profit to him, and that he should not seek to reduce all business to his own level when he is losing money even as a measure of self-interest for himself.

Canadian Bell First Aiders Win Third Successive Year.

First aiders of the Bell Telephone Co. of Canada have been awarded the Wallace Nesbitt general trophy, emblematic of the Industrial First Aid Championship of Canada, for the third successive year, according to the 1931 results announced recently. This year's winners, representatives of the Montreal division plant department, also held the same trophy last year; while this year's runners-up in the Toronto division plant department were Canadian industrial champions two years ago.

This record established this year marks the first time in the history of this particular trophy that it has been won for a second consecutive season. That the Bell company of Canada has held the trophy for three years in succession is another enviable achievement in itself.

The Montreal team this year scored 179 out of a possible 240 points, while the Toronto runners-up had 166 points. A second Toronto team was fourth in this year's list of awards, while Bell Telephone teams in Belleville, London and the Hamilton-Niagara division were placed seventh, eighth and fourteenth, respectively.

This achievement is remarkable in view of the fact that the telephone men's first aid studies are made wholly as a spare-time hobby, and their results are notable when compared with those of certain competing teams whose first aid training is a regular part of their daily work.

Distribution of Winter Telephone Directory in Chicago Started.

Delivery of the Chicago alphabetical telephone directory, winter, 1931-32, was started November 10 and will be completed by November 23, according to the Illinois Bell Telephone Co.

Approximately 500 men have been hired to make delivery. This personnel, recruited through various employment relief boards, is largely composed of married men who need the work to aid their families.

Throughout the city 900,000 books will be distributed in this general delivery. More than 4,000,000 pounds of paper have gone into this issue of the directory, each copy weighing 64 ounces and having 1,464 pages.

Long Distance Telephone Service Used in Rehearsing New Show.

Transcontinental telephone service recently solved a big problem of rehearsals for one of Broadway's latest stage extravaganzas. While the newest edition of "Varieties" was being prepared, rehearsals could not be carried on satisfactorily because Miss Ginger Rogers, scheduled for one of the stellar roles in the cast, was in St. Louis, Mo., completing another engagement.

The idea of rehearsals by telephone was conceived and arrangements were made for special wire service to St. Louis and for special headpieces in New York so that every one of the some 50 members of the cast assembled there could listen in and respond to their cues.

Thus, voices traveled for four successive nights over several thousand miles of telephone wire between midnight and 4:00 a. m., until Miss Rogers had completed her St. Louis engagement and was able to come to New York by airplane in time for the final rehearsals prior to the actual staging of the new show.

"Cope" TOOLS for UNDERGROUND CABLE INSTALLATION

Quick Coupling Rods
Screw Coupling Rods
Cable Benders
Cable Racks
Cleaning Tools
Pull in Guides
Manhole Guards
Reel Jacks

T. J. COPE, Inc.
6122 Vine Street, Philadelphia, Pa.
19 So. La Salle Street, Chicago, Ill.

Note: Supply lines generally use larger conductors than communication lines so there is less liability of contact between the two if the supply conductors are located in the upper position. See Fig. 2. This relative location also avoids the necessity of workmen on communication conductors passing through supply conductors and working above them, and avoids the necessity of increasing the grade of construction requirements for communication conductors.

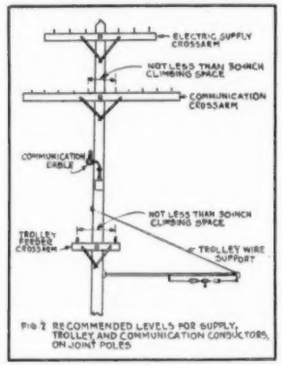


Fig. 2 Recommended Levels for Supply, Trolley and Communication Conductors on Joint Poles

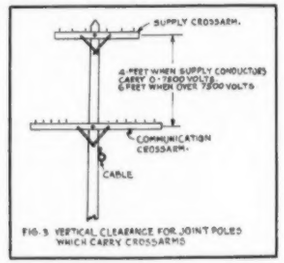


Fig. 3 Vertical Clearance for Joint Poles which Carry Crossarms

Vertical Separation of Circuits and Equipment.

One of the most important requirements of joint construction is adequate clearance between power and telephone plant. The principal safety rules covering the vertical separation between power and telephone wires and equipment on joint poles are as follows:

Rule 238-A. The minimum vertical separation between horizontal crossarms of the supply and communication companies, as shown in Fig. 3, should be as follows:

Vertical Clearance Between Supply and Communication Crossarms.

Supply Conductors	Vertical Separation
0-7,500 volts	4 feet
7,500-50,000 volts	6 feet

Rule 238-B. Where line conductors are supported on horizontal crossarms spaced as required above, the vertical separation of line conductors should not be less than 40 inches for 0 to 7,500 volts supply circuits, and 60 inches for 7,500 to 50,000 volts.

Note: Line conductors supported at different levels on the same structure and strung to different sags shall have vertical spacings at the supporting structure so adjusted that the minimum spacing at any point in the space, at 60 degrees Fahrenheit, with no wind, shall not be more than 25 per cent from that required at the supports as given above.

Rule 238-E. The vertical separation between supply conductors and communication equipment may be not less than

40 inches for supply circuits of not over 750 volts, or where supply conductors of any voltage are in permanently grounded continuous metal sheath cable.

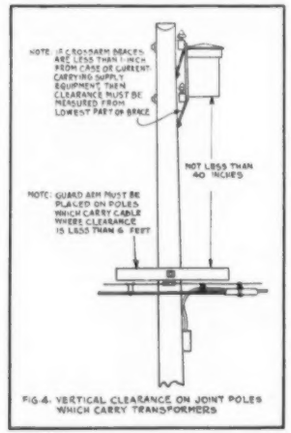
The vertical separation between communication conductors and supply equipment may be not less than 40 inches (0 to 7,500 volts) or 60 inches (7,500 to 50,000 volts). See Fig. 4.

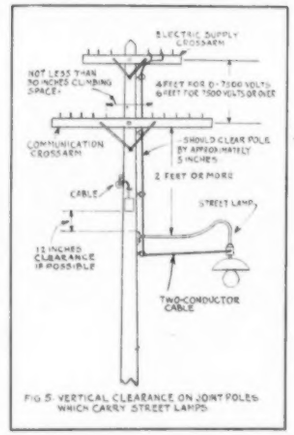
The vertical separation between supply and communication equipment may be not less than 40 inches (0 to 7,500 volts) or 60 inches (7,500 to 50,000 volts).

Span wires or brackets for lamps or trolley contact conductors shall have at least the vertical separation from communication equipment as follows:

From crossarms carrying communication conductors	2 feet
From messenger wires carrying communication tables	1 foot
From terminal box of communication cables, if possible	1 foot

Exception to foregoing—Where it is not practicable to obtain a clearance of one foot from terminal boxes of communication cables, all metal parts of terminals shall have the greatest practicable separation from fixtures or span wires, including all supporting screws and bolts of both attachments. See Fig. 5.


NOTE: IF CROSSARM BRACES ARE LESS THAN 1 INCH FROM CASE OR CURRENT CARRYING SUPPLY EQUIPMENT THEN CLEARANCE MUST BE MEASURED FROM LOWEST PART OF BRACE
NOT LESS THAN 40 INCHES
NOTE: GUARD ARM MUST BE PLACED ON POLES WHICH CARRY CABLE WHERE CLEARANCE IS LESS THAN 6 FEET
Fig. 4. Vertical Clearance on Joint Poles which Carry Transformers


ELECTRIC SUPPLY CROSSARM
NOT LESS THAN 30 INCHES CLIMBING SPACE
4 FEET FOR 0-7500 VOLTS
6 FEET FOR 7500 VOLTS OR OVER
COMMUNICATION CROSSARM
SHOULD CLEAR POLE BY APPROXIMATELY 5 INCHES
2 FEET OR MORE
CABLE
STREET LAMP
12 INCHES CLEARANCE IF POSSIBLE
TWO-CONDUCTOR CABLE
Fig. 5. Vertical Clearance on Joint Poles which Carry Street Lamps

Note: The term "supply or communication equipment" implies the non-current-carrying portion of the respective class of circuits.

Where supply cross-arm braces are less than 1 inch from transformer cases or hangers, the vertical separation from communication equipment shall be measured from the nearest part of this supply equipment, including the crossarm brace, as shown in Fig. 4.

Clearance of Vertical and Lateral Conductors.

Rule 239 of Handbook No. 10 covers the clearance required on vertical and lateral runs. The important parts of this rule are as follows:

Rule 239-A. Vertical or lateral conductors shall be so located that they do not obstruct climbing spaces, or lateral working spaces between line conductors at different levels or interfere with the safe use of existing pole steps.

Rule 239-C. Where within eight feet of the ground, all vertical conductor cables and grounding wires shall be protected by a covering which gives suitable mechanical protection. For grounding wires from lightning arresters, the protective covering specified above shall be of wood moulding, or other insulating material giving equivalent protection. See Fig. 6.

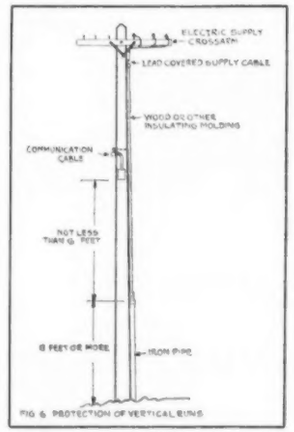


Fig. 6 Protection of Vertical Runs

Exception No. 2. This covering may be omitted from lead sheathed cables in rural districts.

Exception No. 3. This covering may be omitted for communication circuits on private fenced right of way in the case of conductors or cables from underground systems.

Exception No. 4. This covering may be omitted for grounding wires in rural districts having triple braid weather-proof covering, or where such grounding wire is one of a number of grounding wires used to provide multiple grounds.

Rule 239-D. The following clearances are minimum for vertical and lateral supply conductors on jointly used poles:

Clearance of Vertical and Lateral Conductors	Clearance in inches 0 to 7,500 volts
From surface of supports	3
From span, guy or messenger wires	6
From line conductors rigidly supported on fixed supports, such conductors being of same circuit.	3

Rule 239-E. Vertical and lateral communication conductors may be attached directly to the pole or crossarms by means of rings, knobs, or brackets provided that they are rubber-insulated paired conductors and that in the case of joint poles, the clearances previously specified from open supply lines is observed.

Do all your men have one of

TELEPHONY'S

Engineering

Handbooks?

ARE there sufficient copies of TELEPHONY reaching your company so that every man can acquire an individual handbook of Telephony's Engineering Data sheets? The contents of many single issues are of enough value to warrant the subscription price which, as you doubtless know, is $3.00—for fifty-two issues.

Check up among your staff today—find out how many extra copies of TELEPHONY are required—then send in your order for the additional subscriptions.

Telephony

Telephone Wabash 8604

608 S. Dearborn St. Chicago

MANUFACTURERS' LITERATURE

The following is a brief description of recently published bulletins, catalogs, etc. If you are interested in obtaining copies address your request to the manufacturer.

Notices not previously published

POLES

A 16-page illustrated booklet entitled, "Termites—A Growing Menace to Untreated Timber." **Ayer & Lord Tie Company, Railway Exchange Bldg., Chicago, Ill.**

SWITCHBOARDS (P-A-B-X's)

The Strowger Type 32 P-A-B-X has a capacity of 6 local lines and 2 central-office trunks, and provides facilities for handling trunk calls at any station, thus eliminating the attendant's cabinet. It is described in an illustrated circular, recently published. **Automatic Electric Inc., 1033 W. Van Buren St., Chicago.**

Notices Previously Published

AUTOMATIC SWITCHBOARDS

Bulletin 576, "Installation of Sectional-Type Strowger Switching Equipment," shows strikingly how sectional design has simplified the installation of automatic switching equipment. **Automatic Electric Inc., 1033 W. Van Buren St., Chicago.**

CLIMBERS

16-page booklet illustrating and describing climbers, straps, pads, tool belts and safety straps for linemen. **W. H. Buckingham, 503 State Street, Binghamton, N. Y.**

MAGNETO EQUIPMENT

New 72-page general catalog prepared expressly for magneto exchanges. It completely covers all necessary equipment, apparatus, and supplies for magneto plants. **Kellogg Switchboard & Supply Company, 1066 West Adams Street, Chicago, Ill.**

POLES

"Handbook of Practical Information About Cedar Poles and Butt-treating," is the title of a 40-page, illustrated book now available. **Page & Hill Company, Minneapolis, Minn.**

RINGING CONVERTERS

Bulletin No. 150 entitled "Leich Ringing Converters" describes and illustrates converter equipment for producing ringing current; this includes harmonic converters, ringing frequency converters and ringing converters with charger equipment. **Leich Electric Co., Genoa, Ill.**

SALES CAMPAIGNS

Two Small Folders specially designed for extension sales campaigns are now available. They will be furnished complimentary all ready for insertion with your monthly bills—they can be obtained in any quantity required. **American Electric Company, Incorporated, State & 64th Streets, Chicago, Illinois.**

TELEPHONES

A circular illustrating and describing Masterphone construction. **Kellogg Switchboard & Supply Co., 1066 W. Adams Street, Chicago, Ill.**

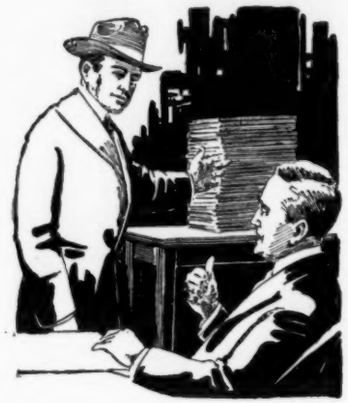
TELEPHONES

Bulletin 1034, a completely revised and enlarged catalog of Strowger Dial Telephones and Telephone Parts, both for central battery and for local battery service. Among the new items included are pay stations, the Strowger Telephone Call Recorder, and the filter coil unit for eliminating radio interference from subscribers' dials. **Automatic Electric Inc., 1033 W. Van Buren St., Chicago, Ill.**

WOOD PRESERVATIVE

An eight-page booklet entitled, "ZMA for Wood Preserving," regarding the different uses of ZMA wood preservative. **Curtin-Howe Corporation, 405 Lexington Ave., New York City, N. Y.**

When writing please mention TELEPHONY



"Every man needs his own copy now"

"Yes, we increased our subscription order to TELEPHONY. Since the publishers have been presenting those Engineering Data Sheets all of our men want their own copy of TELEPHONY.

In addition to the data sheets which are printed each week, TELEPHONY contains articles and news of interest and immense value for every person associated with the telephone business.

Every man in Your organization needs his own copy now!

Telephony

Telephone Wabash 8604

608 S. Dearborn St. Chicago

HIGHWAY "Certified Winch Equipment"

Any rough looking winch may do the job for awhile—but it is the Highway Winch of precision manufacture and carefully selected materials that insures long life and safety for the line crew.

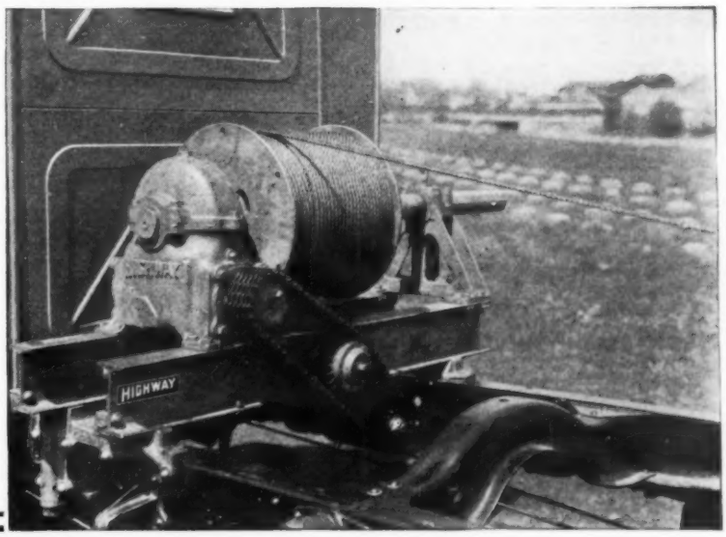
A type and size for every job—Associated items to complete any desired installation.

Write for Catalogue

HIGHWAY TRAILER CO.
EDGERTON, WISCONSIN.

Manufacturers of

Earth Boring Machines—Trailers—Bodies—Derricks—Winches



Suttle Equipment Co.
FACTORY AND MAIN OFFICE
Lawrenceville, Illinois

Toll Tickets

1-A OUT and 2-A OUT — WHITE

100,000 lots

PER M **20c**

50,000 to 99,000, per M.....22c
25,000 to 49,000, per M.....27c
10,000 to 24,000, per M.....32c

1-B IN and 2-B IN — YELLOW

25,000 lots, per M.....30c
10,000 to 24,000, per M.....35c
1,000 to 9,000, per M.....40c

Printed on Highest Grade Toll Ticket Paper. Send for Complete Set of Samples and Prices.

AYER & LORD TIE CO.

CHICAGO

RAILROAD CROSS TIES
TIMBER PRODUCTS
LUMBER
POLES
PILING
FENCE POSTS

WOOD TREATMENTS and PRESERVATION

PLANTS

Carbondale, Ill., Grenada, Miss., Louisville, Ky., North Little Rock, Ark., Montgomery, Ala., Marine Ways-Paducah, Ky.

"CREOSOTE OIL PREVENTS DECAY"

WHAT THE COURTS AND COMMISSIONS ARE DOING.

(*Continued from page* 24.)

Vt., which collectively serve 1,712 subscriber stations, with 43.4 pole miles of toll lines. The plant is said to be of substandard type of design and construction, the older portions being of low-grade type, while the newer portions are of higher grade and, in some instances, approach the standard type of telephone plants. The capital stock of the Northern company consists of 2,400 shares of a par value of $25 each. This stock is now held by 42 stockholders.

An appraisal made by one of the New England company's engineers finds the reproduction cost new of the properties to be $185,911, and less depreciation $122,330. On the basis of a value of $140 a share for the New England company's stock, the cost of the entire capital stock of the Northern company is figured at $88,500.

No competition in telephone service exists between the New England company and the Northern company. There is some duplication of stations between the Northern company and three small Independent companies which operate in the same territory. The Northern company's lines connect with each of the systems of these three companies for interchange of toll traffic, and also with the lines of the New England company. All existing toll connections will be maintained. No change in rates is contemplated.

Additional Night Emergency Telephone Service Denied.

The petition of Dr. A. J. Button for additional night emergency telephone service at the Greenbush exchange of the Greenbush Telephone Co., Roseau county, Minnesota, was denied on November 3 by the Minnesota Railroad & Warehouse Commission. Dr. Button practices medicine and operates a hospital in Greenbush. The town has a population of 387.

The telephone company is giving service on week days from 8:00 a. m. to 9:00 p. m.; holidays and Sundays from 10 a. m. to 12 m., and from 7:00 p. m. to 8:00 p. m. The company is serving 21 business telephones, at a net monthly rate of $2.50; 10 residence telephones at $1.50. In addition, it performs switching services for 10 rural farm line telephone companies, having 164 telephones, at a net monthly rate of 35 cents per telephone.

The revenue derived from these several classes of service by the Greenbush Telephone Co. aggregates, at present, $124.90 per month. In the year 1930, the company's revenues were insufficient to meet the necessary operating expenses and taxes, which had been "pared to the bone."

Of the 10 rural lines switched by the Greenbush company, line 4 is connected directly with Dr. Button's hospital, after telephone office hours, for night emergency service; lines 3 and 24 are connected directly with the hospital by means of a switch; lines 7 and 9 are connected with the residence of Andrew Lubinski, owner of Greenbush Telephone Co.

Lines 27, 6, 13, 5 and 33 are connected through a booth located between the telephone office and restaurant, which are in the same building, by means of extension bells so that employes in the restaurant can switch the calls through to the hospital.

The villages of Badger and Strathcona, each about 10 miles from Greenbush, are connected up with the Greeenbush exchange through a switch on line 4, which line has a direct connection with the hospital for night emergency service.

In order to fully satisfy Dr. Button's complaint it would be necessary for the Greenbush company to add at least another operator, the commission found. This could not be done without greatly increasing the existing rates and charges for telephone service, so the commission ordered that the petition be denied since the service is adepetition be denied since it finds the present service reasonable when the number of subscribers, rates, etc., are considered.

Summary of Commission Rulings and Schedule of Hearings.

INTERSTATE COMMERCE COMMISSION.

October 31: Acquisition by the New England Telephone & Telegraph Co. of control of the properties of the Northern Telephone Co., operating in Franklin county, Vermont, by purchase of capital stock found to be of advantage to subscribers and approved accordingly.

CALIFORNIA.

October 30: In order to pay for properties of Ontario & Upland Telephone Co., the Pomona Valley Telephone & Telegraph Union and Home Telephone & Telegraph Co. of Chino, together with indebtedness assumed in purchase of these companies, the Associated Telephone Co., Ltd., authorized to issue and sell $500,000 face value of its first mortgage 5 per cent gold bonds, series "A," due 1965, at not less than 95 per cent of face value, plus accrued interest, and to issue and sell not exceeding 31,604 shares of its common capital stock without nominal or par value at a price of $25 a share.

ILLINOIS.

November 12: Hearing in Chicago before Commissioner Brinkman on complaint of Roy Burget, et al., against the Milford Telephone Co. relative to unsatisfactory telephone service in Milford and vicinity.

INDIANA.

November 3: Petition filed by residents of Marion asking for a reduction of rates charged for service furnished by the Indiana Bell Telephone Co.

November 4: Hearing on petition of the St. Joseph County Telephone Corp. asking for authority to increase its rates for service applicable to Walkerton, North Liberty and other exchanges.

MINNESOTA.

November 3: Denial given petition of Dr. A. J. Button asking for additional night emergency service at Greenbush, which is operated by the Greenbush Telephone Co. Dr. Button operates a hospital and practices medicine in Greenbush.

The commission found that the company, at the present time, is rendering rea-

SPECIALISTS IN
Rubber Covered
TELEPHONE WIRE
COPPER--BRONZE—COPPERWELD
Standard and Specification Grades
GraybaR
"There's a Graybar House near you"
The Whitney Blake Company
NEW HAVEN, CONN.
MANUFACTURERS
Specially equipped to make telephone wire and maintain highest standards
FOREIGN DISTRIBUTORS International Standard Electric Corporation 67 Broad St., N. Y. City.

sonably adequate service, including night emergency service, when due consideration is given the limited number of subscribers, earnings, present rates, charges, etc.

November 12: Hearing in St. Paul on complaint of the Eastern Farmers Telephone Co., of Packers Prairie, against the Federal Public Service Corp. of Minnesota alleging parallel construction and resultant interference from high tension electric lines and asking for relief and protection from such interference.

November 24: Hearing in Sanborn on petitions of C. W. Gorres, R. B. Flaig, et al., requesting reduction in rates charged for rural telephone service by the Minnesota Union Telephone Co. at its Sanborn exchange.

MISSOURI.

November 13: Hearing on joint application of the Scotia Telephone Co. to sell and the Southeast Missouri Telephone Co. to buy certain property located in Madison, Bollinger, Stoddard and Butler counties in Missouri, and county of Clay in Arkansas.

NEW MEXICO.

October 27: Paul Dodge, publisher of the Tucumcari News, filed complaint about telephone rates in Tucumcari and the class of equipment maintained by the telephone company. Commissioner Hugh Williams requested F. E. Farrell, El Paso-New Mexico manager of the Mountain States Telephone & Telegraph Co., to investigate.

NORTH DAKOTA.

September 29: The Northern States Power Co. filed a schedule of telephone rates for one-way trunk line service in the city of Minot.

October 15: Application filed by the Northwestern Bell Telephone Co. asking for authority to discontinue its exchange at Kief.

OHIO.

November 17: Hearing on joint application to permit Ohio Cities Telephone Co. of Dover and New Philadelphia, to purchase properties of the Ohio Associated Telephone Co., of Marion and of the Freeport Telephone Co., of Freeport.

November 18: Hearing on application of the Plymouth Telephone Co., of Plymouth, asking for authority to connect some of the telephones now attached to the Plymouth exchange to the Jefferson exchange, and to be permitted connection with the exchange of the Plymouth company at Griggs. The Jefferson exchange is operated by the Northern Ohio Telephone Co.

OKLAHOMA.

November 18: Hearing on complaint of the city of Poteau against the Oklahoma-Arkansas Telephone Co. for reduced rates.

November 27: Continued hearing from October 30 on complaint of the city of Tulsa against the Southwestern Bell Telephone Co. asking adjustment of rates for the Vern station.

SOUTH CAROLINA.

November 2: A complaint against the rates of the Southern Bell Telephone & Telegraph Co. throughout South Carolina filed by the Columbia Transportation Association. The complaint is signed by several hundred persons claiming to be subscribers of the company.

The complaint states that "the Columbia Transportation Association is a duly organized business firm with headquarters located at Columbia, S. C., supported and maintained by a clientele of business operations within South Carolina and properly engaged in the business of rate adjustments; representing in this case numerous users and subscribers of Southern Bell telephones within the state."

Once the Weakest Point in Line Construction was the Old Hand-Made Joint

Give a lineman plenty of time and good weather conditions and he'll usually turn out as good a joint as you'd ask for. But send him out on a rush job in bad weather, under adverse conditions, and you know the answer. The hand-splice won't hold.

A large per cent of the line trouble experienced in the past by Utility Companies, working under the old system of hand splicing has been traced directly or indirectly to defective joints.

but now

A NATIONAL SLEEVE SPLICE *is the* strongest part *of the whole line*

National Sleeves are modern, up-to-date splices that have proven after many years of daily service to be the most practical and scientific connectors in use today. One of the principal reasons for this universal acceptance is that they are absolute proof against the weakness of human nature.

When you use a National Sleeve in making the splice, you are assured of uniform joints all along the line.

National Double Tube Sleeve

National Double-Tube Sleeves

This National in its various sizes is probably the most widely used splicing sleeve manufactured and sold. Made from the best grade pure copper. Each detail of operation minutely supervised from the making of the dies to packing and shipping of the finished sleeve. Sizes 17 B & S and up.

THE NATIONAL TELEPHONE SUPPLY CO.

5100 Superior Ave. Cleveland, Ohio

J. K. JOHNSTON
TELEPHONE
JJK
ENGINEER
INDIANAPOLIS

During recent years I have been privileged to appraise Telephone Exchanges all over the United States. The list totals 750. Would you like to avail yourself of my services?

1038-9 Lemcke Building

Frank F. Fowle & Co.
Electrical and Mechanical
ENGINEERS
221 North La Salle St. CHICAGO

CONSULTING
Telephone Engineer
GARRISON BABCOCK
AMERICAN TELECHRONOMETER CO.
White Building
SEATTLE, WASHINGTON

SPOONER & MERRILL, Inc.
CONSULTING ENGINEERS
Specialists in Public Utilities
TELEPHONE - ELECTRIC - GAS
WATER - RAILWAY
Valuation—Examination—Engineering
CHICAGO, ILLINOIS
20 No. Wacker Drive

Consulting Telephone Engineers
W. C. POLK — J. W. WOPAT
Plans, Estimates and Reports,
Appraisals and Supervision
101 West 11th St. Kansas City, Mo.

EVER-PROTECT CABLE COMPOUND
EFFECTIVE *in maintaining your underground and aerial cable in perfect condition*
NATIONAL CABLE COMPOUND CO.
MITCHELL INC. INDIANA

J. G. WRAY & CO.
Telephone Engineers
Specialists in Appraisals, Rate Surveys, Financial Investigations, Organization, and Operation of Telephone Companies.
J. G. Wray, Fellow A. I. E. E.
Cyrus G. Hill
2130 Bankers Bldg., Chicago

TELEPHONE NEWS FROM FOREIGN LANDS.

(*Concluded from page 25.*)

Subscription rates are MT$10 (U.S.$2.50) monthly for the first telephone of a given subscriber, and MT$5 (U.S.$1.25) is charged monthly for each additional telephone rented to the same person, even if in different parts of the city. This rate may be soon increased. The whole traffic is relatively moderate; however, in Addis Ababa it is steadily increasing and is at present about as heavy as existing facilities can well carry.

Municipal telephone systems were established at Dire Daoua and Harrar about 1926 by means of old equipment previously used in Addis Ababa. Both small cities are said to have a kind of service for limited clients. Eight trunk lines radiate from Addis Ababa into most of the provinces of Ethiopia. All lines are single wire and used for telegraphing; however, telegrams are always telephoned.

Long distance telephone messages are impracticable, passing through many relays, and are not clearly received beyond a probable maximum of 100 miles. Anyone in Addis Ababa desiring to communicate with the interior must himself speak the message in the proper booth, of which there are eight in the post office, or have an interpreter do the speaking for him.

The present length of telephone line in Ethiopia is estimated at 5,113 miles. Small extensions in remote provincial areas might bring the total mileage to around 6,000. The two telegraph lines add about 1,229 miles.

Swedish Telephone Administration Celebrates 50th Anniversary.

The Royal Swedish Telephone Administration celebrated the 50th anniversary of the opening of public state telephones in Sweden on September 1, 1931, reports United States Trade Commissioner Basil D. Dahl, Stockholm, Sweden. During the last 50 years Sweden has reached a dominant position in the fields of telephone manufacturing and telephonic communication. Telephones have been made there since 1877.

There are 534,000 telephones, or approximately one per 11 inhabitants, and more than 4,000 telephone exchanges in Sweden at present, according to Count H. A. Hamilton, the director general of the Royal Swedish Telephone Administration. The total length of telephone lines approximates 966,000 kilometers and the total amount of capital invested is in the neighborhood of 300,000,000 crowns.

During the past year 791,000,000 telephone calls, approximately 131 calls per capita, were registered. A large part of the Stockholm telephone system is automatic and exchanges of this kind also have been installed in several other cities and towns in Sweden.

TELEPHONE DIRECTORY & ADVERTISING COMPANY
A Telephone Directory Advertising Sales Organization
Main Office
Telephone Bldg. Kansas City, Mo.
Wichita, Kans. Ft. Wayne, Ind. Chicago
816 Brown Bldg. 212 Guarantee Bldg. 100 W. Monroe

ACCOUNTING
HERDRICH AND BOGGS
Certified Public Accountants
Specializing in Telephone Accounting and Rate Cases Since 1918
901-7 Continental Bank Bldg.
Indianapolis, Indiana

Universal Insulators
will support your drop wires to your entire satisfaction and at a minimum cost. Are you a user? Samples free on request.
Universal Specialty Co.
711 Poplar Street
Terre Haute, Ind.

CONSULTING TELEPHONE ENGINEERS
Rates Financing Accounting Managing
Appraisals and Reports
Radio Program Service Specialists
Construction Contractors
TELEPHONE ENGINEERING AND MANAGEMENT COMPANY
Lima, Ohio

NILCO
Reg. U. S. Pat. Off.

TELEPHONE SWITCHBOARD LAMPS
Nilco Lamp Works, Inc., Emporium, Pa.

COFFEY SYSTEM
Exclusive Telephone Accountants
CERTIFIED
Systems Installed
Audits and Special Services
CENTRAL ACCOUNTING DEPARTMENT
Consolidated Bldg., Indianapolis

The advertisers on this page will render you prompt, efficient service